427-50-01-004

DRAFT

LANDSAT DATA CONTINUITY MISSION

OPERATIONAL LAND IMAGER (OLI)

CONTRACT DOCUMENTATION REQUIREMENT LIST (CDRL)

May 13, 2005

National Aeronautics and Space Administration

Goddard Space Flight Center
Greenbelt, Marvland

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Signature Page

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LDCM PROJECT
DOCUMENT CHANGE RECORD

Sheet: 1 of 1

REV LEVEL	DESCRIPTION OF CHANGE	DATE APPROVED

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LIST OF TABLES

1.0 INTRODUCTION

This Contract Documentation Requirements List (CDRL) document defines the requirements for deliverable documentation to be provided by the Operational Land Imager (OLI) Contractor. Section 2.0 includes definitions and instructions for mailing and/or distribution. Table 3-1 presents the CDRL item by item, with due dates, quantity, and a distribution key. Section 4.0 provides the Data Item Description (DID), a description of each item and describes use, and preparation information. Except where specifically indicated to the contrary, the formats and drawing standards used shall be those normally used by the OLI Contractor and/or by its subcontractors.

2.0 DEFINITION OF DUE DATES/MATURITY, DEFINITION OF CATEGORIES, AND MAILING DISTRIBUTION INSTRUCTIONS

2.1 DUE DATES/MATURITY - RELATED DEFINITIONS

The following definitions apply to the "DUE DATE, MATURITY" column in Table 4-1. Unless otherwise specified, deadlines are in working days.

(a) DUE DATE:

(1) IPDR, ICDR, IPER, etc: Instrument Preliminary Design Review, Instrument Critical Design Review, Instrument Pre-Environmental Review, Instrument Pre-Ship Review, etc. Documentation to be delivered to GSFC 5 working days prior to review, unless otherwise stated.

(2) As Generated, Update As Required (UAR): After each initial edition, revision, addition, etc. Items that are critical to schedule, performance, or interface shall be transmitted to GSFC by facsimile or express mail within 48 hours of generation. When available, an electronic version shall also be provided.

(3) Monthly: Submitted on monthly basis

(4) T: Launch Date

(5) DACA: (Calendar) days after contract award

(6) E: Electronic copies are due at the same time as hard copies unless otherwise specified in this column.

(b) MATURITY:

(1) Preliminary: The initial submission of an item. To be completed as is practicable at the time of preparation.

(2) Final: The complete thorough submission of an item for approval, review, or information. This does not preclude updating later. Any updates shall require the same "approval/review" process as was required for the previous submissions.

(3) Current: The best up-to-date information available at the time.

Other entries in the "DUE DATE, MATURITY" column are self-explanatory.

2.2 QUANTITY - RELATED DEFINITIONS

The quantities to be delivered shall be per the CDRL listing in column "Quantity (QTY)" in Table 3-1 of this document. If separate quantities are not specified for separate submission due date/maturity items, then the listed quantity applies to all submissions.

2.3 DISTRIBUTION - RELATED DEFINITIONS

The following definition applies to the "Distribution (DIST)" column in Table 3-1.

H – Hardcopy(s) of this documentation shall be delivered to the Contracting Officer at GSFC Code 427.

E - Data items shall be delivered in electronic format to a GSFC Landsat specified web portal unless otherwise noted in Table 3-1. Quantities refer to hardcopies, not electronic copies. The Contracting Officer shall be notified of electronic submission of the deliverable in writing. Electronic deliverables shall be delivered in the following formats unless otherwise approved by the government:

Text Documents: PDF (searchable) or MSWord
Presentations: PDF (searchable) or PowerPoint
Spreadsheets: Microsoft Excel
Database: Delimited ASCII files accompanied with database schema document defining tables and entries.
Schedules: PDF and MS Project
Schematics and Drawings: Contractor format
Photographs: JPEG or current industry standard.
Video: Any readily available open standard (e.g., AVI, MPEG)

R – For Reviews, hardcopies will be made available at the review site for government representatives. (Generally, this will be in addition an electronic copies being made available prior to the review.)

If separate distribution instructions are not specified for separate submission due date/maturity items, then the listed distribution applies to all submissions.

2.4 CATEGORY - RELATED DEFINITIONS

The following definitions apply to "Submission Category (CAT)" column in Table 3-1. If separate approval instructions are not specified for separate submission due date/maturity items, then the listed approval instruction applies to all submissions.

A Approval: Documents in this category require approval by the GSFC Contracting Officer's Technical Representative (COTR) prior to use by the contractor. Receipt by the Government shall occur within the time specified in the "Due Date" column of Table 1 of this document.

Requirements for re-submission shall be as specified in the letters of disapproval. For most cases the contractor will be required to resubmit the document within 30 days of receiving comments from the Government. If the contractor has not received response from GSFC within 60 days of delivery of a CDRL item (15 days for spacecraft-level test procedures), the contractor may proceed as if the document has been approved.

R Review. Documents in this category require delivery to the Government prior to use and within the time period specified in the "Due Date" column of Table 1 of this document. They are subject to evaluation by the Government or its designated representatives to determine Contractor effectiveness in meeting contract objectives. When Government evaluations reveal inadequacies, the Contractor shall respond within 30 calendar days of receiving comments (3 days for test and calibration/validation procedures) or provide a plan within 7 calendar days (1 day for test and calibration/validation procedures), for approval by the Government, for closing deficiencies.

I Information. Data in this category shall be delivered to the Government within the time period specified in the “Due Date” column of Table 1 for the purpose of determining current program status, progress, and future planning requirements.

3.0 OLI CONTRACT DISTRIBUTION LIST

Table 3-1 comprises the OLI Contract Distribution List.

Table 3-1 OLI Contract Documentation Requirement List (CDRL)

#	MANAGEMENT	DUE DATE, MATURITY	QTY	DIST	CAT
PM-1	Earned Value System Baseline Review Package	60 DACA Update if Re-baseline occurs	5	R, E	I
PM-2	WBS Diagram and Task Description Updates	45 DACA, Update As Required	3	H, E	I
PM-3	Detailed Schedules	45 DACA, Update at MPSR	1	H, E	I
PM-4	Monthly Project Status Reviews (MPSR)	Monthly (within 7 calendar days of end of previous month)	30	E, R	I
PM-5	Financial Reports (NASA Form 533)	Monthly (within 15 calendar days of end of previous month)	2	H	R
PM-6	Earned Value System Reports	Monthly (within 7 calendar days of end of previous month). Format 5: Updated list of the rankings every 6 months, based on performance to date.	1	H, E	I
PM-7	Responses to Formal Actions	30 Calendar days after receipt of action from GSFC, Final	3	H, E	A
PM-8	Final Report	Launch + 5 mo for FM1 and FM2 , Final	2	H, E	A
PM-9	Configuration Management Plan	Final, As Generated	2	H, E	A
PM-10	Risk Management Plan	45 DACA, Final	1	H, E	I
PM-11	Project Management Plan	30 DACA, Final	1	H, E	R
PM-12	Exceptions to GSFC-STD-1000	With Proposal. Final	1	H, E	I

#	REVIEWS	DUE DATE, MATURITY	QTY	DIST	CAT
RE-1	Instrument System Requirements Review (ISSR) Data Package	Electronic copy 5 days prior to ISRR	40	H, R, E	I
RE-2	Peer Review Data Packages	At Review Electronic copy prior to Review if available	10	H,R,E	I
RE-3	Instrument Preliminary Design Review (IPDR) Data Package	Electronic copy 5 days prior to IPDR	50	H,R,E	I
RE-4	Instrument Critical Design Review (ICDR) Data Package	Electronic copy 5 days Prior to ICDR	50	H,R,E	I
RE-5	Instrument Pre-Environmental Review (IPER) Data Package	Electronic copy 5 days prior to IPER, Final	50	H,R,E	I
RE-6	Instrument Pre-Ship Review (IPSR) Data Package	Electronic copy5 days prior to IPSR, Final	50	H,R,E	A
RE-7	Data in Support of Mission Level Reviews	Electronic copy 14 days prior to LDCM review Hardcopy 7 days prior to LDCM review Electronic copy 14 days prior to NPOESS review Hardcopy 7 days prior to NPOESS review	2 2	H, E H, E	R R

#	SOFTWARE	DUE DATE, MATURITY	QTY	DIST	CAT
SW-1	Software Development and Management Plan	90 DACA	2	H,E	A
SW-2	OLI Data Format Control Documents	IPDR (preliminary) ICDR (Final)	10	H,E	A
SW-3	Software Design Document/Users Guide	ICDR (preliminary) IPSR (Final), Update as Required	3	H,E	I
SW-4	Software Test Readiness Review (SWTRR) Data Package	At review, Final	10	R	I
SW-5	Software Acceptance Review (SWAR) Data Package	At review, Final	10	R	R
SW-6	GSE Software Test Readiness Review (GSWTRR) Data Package	Electronic copy 5 days prior to GSWTRR, Final	10	E,R	I
SW-7	Flight Software Test Plan	IPDR	2	H,E	R
SW-8	Software Test Procedures	5 Days prior to each activity, Final	-	E	I
SW-9	Software Test Reports	15 calendar days after Test, Final	-	E	I
SW-10	Software Delivery Package	With submittal of each software release. With delivery per SOW para. 5.4.5.	- -	E E	R R

#	INTEGRATION AND TEST	DUE DATE, MATURITY	QTY	DIST	CAT
IT-1	Spare Parts List	5 days prior to each major review Updates as Required	1	H, E	A
IT-2	Command and Telemetry List and Description	Volume 1: 5 Days prior to ICDR, Update as required Volume 2: Draft at start of I&T, Final at IPSR, Update as required	5	H, E	R
IT-3	Detailed Test Procedures	5 Days prior to First Unit Tests, Final Spacecraft-specific tests: Draft 30 days prior to IPSR. Final: As generated (TBD) Launch site-specific tests: Draft: 60 calendar days prior to S/C PSR. Final: As generated (TBD)	- - -	E E E	R A A
IT-4	Packaging, Handling, Storage, and Transportation (PHS&T) Plan and Procedures	21 calendar Days prior to ICDR, Final	3	H, E	R
IT-5	Storage Testing Procedures	ICDR, Prelim IPSR, Final	3	H, E	R
IT-6	OLI to SC Integration Procedure(s)	Draft 60 days prior to IPSR Final: As generated (TBD)	- 3	E H, E	R A
IT-7	Command and Telemetry Database	Preliminary (TBD) Updates as generated (TBD)	- -	E E	R R

#	CALIBRATION/VALIDATION	DUE DATE, MATURITY	QTY	DIST	CAT
CV-1	Calibration/Validation Plan	IPDR (Draft), ICDR (Final), Updates as required	3	H, R, E	A
CV-2	Calibration/Validation Procedures	At instrument facility: 10 days prior to use. UAR At spacecraft facility (TBD) On-orbit (TBD)	3 3 3	H, E H, E H, E	R A A
CV-3	Calibration/Validation Test Reports	Electronic Data 3 days post-test Report – 10 days post-test	- 3	E H, E	I R
CV-4	Calibration/Validation Summary Report	Pre-Ship Report: IPSR, Post-Launch Report: IOC + 3 months	3	H, E	I
CV-5	Radiometric Math Model	15 days prior to ICDR, Final Update as required with measured data	3	H, E	R
CV-6	OLI Optical Analytical Model	IPDR 15 days prior to ICDR, Final Update as Required	3	H, E	I
CV-7	Algorithms and Calibration Parameters	IPSR, IOC	3	H,E	A
CV-8	Line of Sight Processing Algorithms	10 days prior to IPSR, Draft IPSR, Final	3 3	H, E H, E	R A

#	SYSTEMS ENGINEERING	DUE DATE, MATURITY	QTY	DIST	CAT
SE-1	Configuration Change Requests (CCR) Class I .	As Generated, Final	2	H, E	A
SE-2	Contractor Generated Internal Technical Information	As Requested,	-	E	I
SE-3	Engineering Analyses & Test Reports	As Generated, Final Updated to reflect design changes, as necessary	2 2	H, E H, E	I I
SE-4	Trend Analysis (List) (Reports)	ICDR, Final IPER, Final IPSR, Final Monthly, Current.	2 2	H, E H, E	R I
SE-5	Structural Math Model	2 months ACA, Simplified Model 5 days prior to IPDR, Initial 5 days prior to ICDR, Final 10 days after modal survey, Update if required	- - - -	E E E E	R R A A

SE-6	Thermal Math Model	5 days prior to IPDR, Initial 5 days prior to ICDR, Final Reduced Thermal Model, Draft at CDR Reduced Thermal Model, Final after Thermal Balance Testing Update as required	3 3 3 3 3	H, E H, E H, E H, E H, E	R R A A A
SE-7	Wiring Diagrams	5 days prior to ICDR Final at IPSR Updates As Required	2	H, E	I
SE-8	Approved or Controlled Drawings	Electronic copy at ICDR, Updates as Required Hardcopies and Electronic Final set at IPSR (as built)	2	H, E	I
SE-9	System Performance Verification Plan	10 days prior IPDR 10 days prior to ICDR 10 days prior to IPER, Final Updates As Required	5	H, E	A
SE-10	Verification Reports	As Generated, Final Spacecraft-Level Tests	1 1	H, E H, E	I A
SE-11	Interface Control Document Inputs	As generated based on Spacecraft needs	5	H, E	R
SE-12	Proposed Revisions to the OLI-to-NPOESS Spacecraft Interface Requirements Document	Draft with Proposal, Final 10 days prior to SRR	5	H, E	A

#	SYSTEMS ASSURANCE	DUE DATE, MATURITY	QTY	DIST	CAT
SA-1	Reliability Report	5 Days prior to IPDR 10 Days prior to ICDR, Final Class I change submittal, Final	5	H, E	I
SA-2	Critical Items List (CIL)	5 Days prior to ICDR, Updates As Required	5	H, E	I
SA-3	Worst Case Analyses	As Generated, Current	5	H, E	I
SA-4	Failure/Anomaly Reports (FAR)	Oral Within 24 Hours to COTR and/or Flight Assurance Manager, Prelim Written 3 Working days, Final after FRB closeout	5	H, E	R
SA-5	Material Review Board (MRB) Decisions on Non-Conformance	Update as Generated, Final	5	H, E	A
SA-6	Responses to Alerts	10 days after receipt of Alert, Current	5	H, E	I
SA-7	Acceptance Data Package	End-item delivery, Final	1	H, E	A
SA-8	Limited Life Items List	15 days prior to IPDR, Prelim 5 Days prior to ICDR, Final Updates As Required	5	H, E	I
SA-9	Material Identification Lists (MIL)	90 DACA, Preliminary 5 Days prior to ICDR, Final Updates As Required Final at IPSR (as built)	5	H, E	R
SA-10	Safety Waiver/Non-Compliance Requests	As Generated, Final	5	H, E	A

SA-11	Photographic & Video Records	As Required, Final	See DID	H, E	I
SA-12	Parts Identification List (PIL)	90 DACA, Preliminary 5 Days prior to ICDR, Final Updates As Required Final at IPSR (as built)	5	H, E	R
SA-13	Contamination Control Plan	15 days prior to IPDR, Prelim 15 days prior to ICDR, Final	5	H, E	A
SA-14	Missile System Pre-launch Safety Package (MSPSP) Inputs	5 Days prior to ICDR, Draft 30 Days prior to IPSR, Final Update as Required	5	H, E	A
SA-15	Orbital Debris Assessment Inputs	IPDR, ICDR, (TBD)	5	H, E	R
SA-16	Mechanism Life Test Plan	5 days prior to IPDR	5	H, E	R

#	ON ORBIT	DUE DATE, MATURITY	QTY	DIST	CAT
OO-1	OLI On Orbit Initialization and Validation Plan	90 calendar days prior to IPSR (TBD)	5	H, E	R
OO-2	OLI Orbital Procedures	30 calendar days prior to IPSR (TBD)	5	H, E	A
OO-3	OLI Users Manual	Initial at IPDR Updated at ICDR Final at IPSR	5 5 20	H, E H, E H, E	R R A
OO-4	Operation and Maintenance Manuals	At start of EDU System Integration At start of FM-1 System Integration At start of each FM System Integration	5 5 5	H, E H, E H, E	A A A
OO-5	On Orbit Performance Report	30 calendar days following IOC	5	H, E	A
OO-6	Training Manuals	10 days prior to start of training for: Emulators Engineering Development Unit Flight Model 1	 5 5 15	 H, E H, E H, E	 R R R

4.0 DATA ITEM DESCRIPTIONS

MANAGEMENT DIDs

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
PM-1	EARNED VALUE SYSTEM BASELINE REVIEW PACKAGE

3. Reference:

- Statement of Work; Para. 3.2
- NPD 9501.3A, Earned Value Management
- NFS 1852.242-74, Notice of Earned Value Management System (March 99)
- NFS 1852.242-75, Earned Value Management System (March 99)

4. Use:

To provide a description of the contractor's methods, policies, and procedures utilized in meeting the requirements of NPD 9501.3A. To evaluate the contractor's project management system, and demonstrate the use and understanding of the system by all levels of management. It shall be held at the CF within 60 days after ATP. Follow-up reviews may be required to assess actions taken to correct deficiencies.

5. Preparation Information:

Review will evaluate the reasonableness of contractor schedule and Earned value implementation, and establish a baseline for management of the Project.

The EVS Baseline Review Package shall describe the contractor's Earned Value System.

The EVS Baseline Review Package shall describe the relationship between the WBS and the EVS system and reporting.

The EVS Baseline Review Package shall identify the internal organization elements and the major subcontractors responsible for accomplishing the authorized work.

The EVS Baseline Review Package shall describe the relationship and level of integration of all management control systems (e.g., Planning and Scheduling, Budgeting, Estimating, Work Authorization, Cost Accumulation).

The EVS Baseline Review Package shall identify the managerial positions responsible for controlling overhead.

The EVS Baseline Review Package shall describe how the EVS is integrated with the contractor's functional organizational structure.

The EVS Baseline Review Package shall identify physical products, milestones, technical performance goals to be used to measure output.

The EVS Baseline Review Package shall describe the method of maintaining time-phased baseline.

The EVS Baseline Review Package shall explain the cost to schedule correlation at the work/planning package level.

The EVS Baseline Review Package shall identify management reserve and undistributed budget.

The EVS Baseline Review Package shall identify the authority process for allocating management reserve and undistributed budget.

The EVS Baseline Review Package shall identify bases for allocating the cost of apportioned effort.

The EVS Baseline Review Package shall describe the procedures for measuring performance.

The EVS Baseline Review Package shall describe the procedures for incorporating authorized changes.

Prepare in accordance with the contractor standard plans and policies.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
PM-2	WBS DIAGRAM AND TASK DESCRIPTION UPDATES

3. Reference:
MIL-STD-881.A
SOW 3.2

4. Use:

Provides for relating specifications to the contract end item. Identifies controllable work elements for estimating resources, budgeting, and pricing work assignments and authorization. Serves as a framework for reporting cost, schedule, and technical performance.

5. Preparation Information:

The contractor shall provide updates to the Government-provided Contract Work Breakdown (end-item) structure WBS dictionary and Organizational Work Breakdown Structure in an indentured listing. Using the convention that the Contractor's Project is considered Level 1.0, the updated WBS shall provide details to the level at which the Contractor will manage the project, at least to WBS Level 4. A list of changes/updates shall be provided every six months, or following major revisions to the WBS.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
PM-3	DETAILED SCHEDULES

3. Reference:

SOW 3.4.1

4. Use:

To describe schedule and progress for the OLI instrument, and for understanding and mapping out in detail an efficient process for integrating together all program elements to ensure all aspects of the program are completed when required.

5. Preparation Information:

Current activities shall be addressed as part of a Top-Level Summary of the Schedule, this shall be included with the Monthly Project Status Report (TBD).

The Integrated Master Schedule shall include:

A Activities detailed by task with expected start and completion dates

B Activities associated with major items, components, or definable subassembly, such as printed wiring assembly (PWA).

C Fabrication schedules detailed to the mechanical subassembly level, and to the PWA level, and showing substantive milestones.

D An assembly/test flow diagram that shows sequences of fabrication, assembly, integration and test for components, subsystems, and system and includes quality assurance test points and associated inspection level requirements.

E The contractor shall provide the Government with a series of integrated network schedules and bar charts as described below:

(a) Master Schedule – The master schedule shall include programmatic milestones/events for the overall program from design, manufacturing, integration and test through launch including data on major procurements. The schedule shall be in a format suitable for viewgraph presentations that summarize the schedule data and status contained in the integrated logic network. This chart will be delivered directly from the integrated logic network and will include major program milestones such as Instrument Preliminary Design Review (IPDR), Instrument Critical Design Review (ICDR), Instrument Pre-Ship Review (IPSR), etc.

(b) Integrated Logic Networks – These networks shall be established for each subsystem or subassembly to the electronic board level. The contractor shall provide an

electronic version of the detailed integrated logic network.

(c) Intermediate Schedule – An Intermediate Schedule for each second level WBS shall be submitted. Control milestones will be included on the Intermediate Schedule.

(d) Control Milestone Trend Report – A control milestone trend chart shall be submitted. This report shall consist of the baseline control milestones that have been agreed. The report will also contain a list of the control milestones expected to complete during the reporting period, their baseline completion dates, and their current status.

(e) End Item Float Report – A monthly report shall be submitted for each deliverables subsystem or subassembly comparing the current month floats to the float of the previous month and explain any changes.

(f) Monthly Schedule Analysis – A monthly analysis shall be submitted and a part of the Monthly Project Status Report that will contain a brief description of the current status of each subsystem or subassembly along with descriptions of any existing or potential problems areas. The critical path and near critical paths will be explained along with possible work-arounds being considered to maintain the schedule.

These schedules shall be presented by a flow type network diagram, and by Gantt schedule milestone charts using Microsoft Project.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
PM-4	MONTHLY PROJECT STATUS REVIEWS

3. Reference:

SOW 3.4.1
SOW 5.4.1.1

4. Use:
To evaluate contract status. These reports will be used to provide an opportunity for face-to-face discussions between the contractor and NASA regarding project status, plans and issues.

5. Preparation Information:

The Monthly Project Status Review will be presented at a face-to-face meeting with the LPO within 14 days of the close of the monthly accounting period. These meetings will occur at the contractor's facility, unless modified by mutual consent.

The Monthly Project Status Review shall include the following:

A. Report of Key Technical Parameters; including mass and power budgets, peak and average power budgets, line-of-sight error budgets, radiometric accuracy error budgets, and their current best estimated, calculated, and/or measured values for all parameters. The list of reported Key Technical Parameters shall be agreed upon with the Government and may be revised by the Government as the situation dictates. The values to be presented shall be at least to the major component level of the subsystems, e.g. Mechanism, Power supplies, heaters, cabling, etc. The accuracy of the values shall be identified. Margins and contingency based on maturity shall be identified.
B. Technical status for design and development activities
C. A comparison of planned versus actual accomplishments for the period of time since the prior report.
D. Monthly Schedule Status and analysis of variations to the schedule causing a day or more of schedule change.
E. Summary of the Monthly Financial Status Report
F. Summary of the Earned Value System Report
G. A detailed 12-month "rolling-wave" schedule (3 months of actual, plus 9 months of forecast)
H. Problems encountered during the reporting period, and anticipated approaches for resolution (including, as appropriate, technical issues, manpower and staffing, supplier and

subcontractor issues, etc.)

I. Status of open issues and problems from prior reporting periods
J. Significant plans and activities for the following month
K. Class I and Class II proposed and approved Configuration Control Board Changes
L. Risk Status for top risks

The contractor shall provide paper copies of viewgraphs and other presentation material for all Government attendees at the time of the review. Also to be provided is one CD ROM containing all presentation material readily available in mutually agreed upon electronic format. Presentation material may be in contractor format.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
PM-5	FINANCIAL REPORTS (NASA FORM 533)

3. Reference:

SOW Paragraph 3.2

4. Use:
To provide information for: (1) integrating cost and schedule performance data with technical performance measures, (2) assessing the magnitude and impact of actual and potential problem areas causing significant cost and schedule variances, and (3) providing valid, timely project status information to higher management.

5. Preparation Information:

The Monthly Financial Report shall be prepared in accordance with NFS 1852.242-73 and NPR 9501.2D, NASA Contractor Financial Management Reporting on NASA Form 533M.

The Quarterly Financial Report shall be prepared in accordance with NFS 1852.242-73 and NPR 9501.2D, NASA Contractor Financial Management Reporting on NASA Form 533Q.
At a minimum the reporting structure shall be in accordance with and to the lowest level of the WBS provided with solicitation.

The reporting categories shall include as a minimum:

A. Direct labor by labor category
B. Overhead
C. Fringe Benefits
D. Materials
E. Material Overhead
F. Subcontracts
G. Travel
H. Other Direct Costs
I. Facilities Capital Cost of Money
J. Award Fee
K. Total CPAF

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
PM-6	EARNED VALUE SYSTEM REPORTS

3. Reference:
SOW 3.2
NPR 9501.3
NFS 1852.242-74
NFS 1852.242-75

4. Use:

To provide information for (1) integrating cost and schedule performance data with technical performance measures, (2) assessing the magnitude and impact of actual and potential problem areas causing significant cost and schedule variances, and (3) providing valid, timely project status information to higher management.

5. Preparation Information:

The EVSR shall include data pertaining to all authorized contract work, including both priced and unpriced effort, that has been authorized at a not-to-exceed amount in accordance with the Contracting Officer's direction. The EVSR shall separate direct and indirect costs and identify elements of cost for all direct reporting elements. The EVSR shall consist of the following:

A. Format 1, Work Breakdown Structure (WBS): Format 1 shall provide data to measure cost and schedule performance by summary level WBS elements, and the hardware, software, and services NASA is buying. Critical/major subcontractor summary-level performance measurement data shall be included as an attachment to Format 1. Subcontractor EVSR or Cost/Schedule Status Report (C/SSR) are acceptable.

B. Format 2, Organizational Categories: Format 2 provides the same data as Format 1, sorted by the contractor organization. If the contractor is organized by product, Format 2 is optional. Organizational category reporting shall be to the first level of the program's organizational structure.

C. Format 3, Baseline: Format 3 provides the budget baseline plan against which performance is measured. It is the baseline report used to track all changes to the Performance Measurement Baseline (PMB). Format 3 shall contain budget forecasts for two 3-month periods (columns 10 and 11), two subsequent 12-month periods (columns 12 and 13), and

the remainder of the contract for the last period (column 14).

D. Format 4, Staffing: Format 4 shall provide workforce staffing forecasts for correlation with the budget plan and cost estimates and contain the workforce baseline which will be updated and submitted whenever the Performance Measurement Baseline changes. Organizational category reporting shall be to the first level of the program's organizational structure. Format 4 shall contain baseline and workforce forecasts for two 3-month periods (columns 10 and 11), two subsequent 12-month periods (columns 12 and 13), and the remainder of the contract for the last period (column 14).

E. Format 5, Explanations and Problem Analyses: Format 5 shall be a narrative report used to explain significant cost and schedule variances (+/- 10% or $500k) TBD and other identified contract problems. Subcontractor variance analyses (determined by the prime contractor) and a discussion of the prime contractor's analysis of the subcontractor's performance shall be provided in Format 5. In the initial submission of the EVSR (Format 5), the contractor shall rank, in descending order of criticality (i.e., the most critical elements will be at the top of the list and the least critical will be at the bottom), all reporting-level WBS elements anticipated (as determined by the contractor Project Manager) to be schedule drivers, and all WBS elements (in a similar ranking) anticipated to be the cost drivers on the project. The contractor shall submit an updated list of the rankings every 6 months, based on performance to date. The Government reserves the right to modify this ranking based on Government perception of criticality. If the contractor uses "critical path" scheduling techniques, identification of the critical path by WBS element will meet the schedule drivers' requirement. Ranking of the critical path cost drivers shall also be provided. These critical elements shall reconcile to the Master Schedule submitted to the Government.

F. Variance Analysis: The Variance Analysis shall be a narrative report addressing the following:

(a) Reporting elements that equate to 50 percent of the list of the schedule drivers (i.e., if 20 schedule drivers are listed, the 10 most critical schedule driver variances over $100k will be addressed). If there are 10 or less schedule driver variances, all variances over $100k shall be addressed.

(b) Reporting elements that comprise the top 50 percent of the cost drivers (i.e., if 20 cost drivers are listed, the top 10 most critical cost driver variances over $100k). If there are 10 or less cost driver variances, all cost variances over $100k shall be addressed.

(c) Impact to the contract Estimate-at-Complete (EAC) for all cost and schedule driver variances addressed.

(d) Explanation for all variances at completion over $500k.

(e) Corrective Action Plan, as applicable.

FORMAT: EVSR formats shall be completed according to the instructions outlined in DI-MGMT-81466 and the following forms: Format 1 (DD Form 2734/1); Format 2 (DD Form 2734/2); Format 3 (DD Form 2734/3); Format 4 (DD Form 2734/4); and Format 5 (DD Form 2734/5). Images of the EVSR forms are located at http://www.acq.osd.mil/pm/newpolicy/cpr_cfsr/cpr_gif_new.html. Contractor format shall be substituted for EVSR formats whenever they contain all the required data elements at the specified reporting levels in a form suitable for NASA management use. The EVSR shall be submitted electronically and followed up with a signed paper copy. The American National Standards Institute (ANSI) X12 standards (transaction sets 839 for cost and 806 for schedule), or the United National Electronic Data Interchange for Administration, Commerce and Transport (EDIFACT) equivalent, shall be used for Electronic Data Interchange. This information is located at http://www.unece.org/trade/untdid/.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
PM-7	RESPONSES TO FORMAL ACTIONS

3. Reference:

SOW 3.4.7

4. Use:

Provides input to formal responses prepared by the Project.

5. Preparation Information:

Preliminary responses may be in any form, such as email or telecon, to promote coordination with the Project. Any final responses required by the Project shall be typed and shall include reproducible copies of any supportive material, such as:

A. Engineering reports
B. Sketches
C. Drawing changes
D. Documentation narrative changes
E. Test reports, graphs, etc.
F. Cost estimates

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
PM-8	FINAL REPORT

3. Reference:

Contract Clause C.3
SOW 3.1

4. Use:

To provide a summary of the performance of the contract.

5. Preparation Information:

Refer to contract clause 1852.235-73 (Section C.3 of the contract) for instructions regarding the final report.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
PM-9	CONFIGURATION MANAGEMENT PLAN

3. Reference:

- SOW 3.3
- MAR 2.2.3

4. Use:

The contractor Configuration Management (CM) Plan shall serve as the contractor's planned method of controlling and maintaining configuration control under this contract including control for all changes affecting form, fit or function and any impact on performance, cost, or schedule.

5. Preparation Information:

The contractor's Configuration Management Plan shall describe the scope, approach, methods, and procedures of the system that will be used to implement the configuration management requirements. The CM Plan shall describe the establishment of a Configuration Control Board (CCB) at the contractor's facility that evaluates and dispositions all proposed changes prior to implementation. The CM Plan shall also contain a description of the CM requirements to be included in subcontractor(s) Statements of Work (SOW).

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
PM-10	RISK MANAGEMENT PLAN

3. Reference:

SOW 3.1

4. Use:

Documents how risks will be managed on the program.

5. Preparation Information:

The risk management plan shall include an overview of the risk management process, a description of the organizational responsibilities for carrying out risk management, the details of each major activity in risk management and how it is to be accomplished, the schedule and milestones for risk management activities and the required resources, and a description of how risk information is documented, retained, controlled, and used.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.: 2. Title:

PM-11 OLI PROJECT MANAGEMENT PLAN

3. Reference:

SOW 3.1

4. Use:

Describes how the project is organized and managed by the contractor. It provides the management structure, its system of operation, responsible lines of communications, and key personnel assignments. The organization chart identifies the contractor's OLI project organization with names, functions, lines of authority, coordination, etc

5. Preparation Information:

This plan shall address the overall organization, management approach, and structure of the contractor's OLI Project plus its interrelationships with the parent company and the subcontractors.

Describe how and where the project will operate during all phases of the contract.
This plan shall identify and describe interfaces with the Government, including NASA, USGS, and the NPOESS Program Office, and with the NPOESS spacecraft contractor.

This plan shall include graphical displays such as flow diagrams, WBS, logic networks, etc., to reduce verbal descriptive material.

This plan shall provide an organizational chart(s) and sufficient supplemental narrative to describe fully the following:

(a) Organization proposed for carrying out the project showing interrelationships of technical management, business management, and subcontract management, from lower level through intermediate management to top-level management with detailed explanation of:

1. The authority of your OLI Project Manager relative to other ongoing projects and applicable support organizations within the company structure. Discuss the Project Manager's control over essential resources and functions necessary to accomplish the work.
2. How and by whom interdepartmental work will be monitored and the authority of the

Project Manager over interdepartmental work.

3. Process to be followed by the Project Manager in obtaining decisions beyond his/her authority and in resolving priority conflicts for resources and functions not under the Project Manager's direct control such as personnel, finances, and facilities.
4. The project team members with names and functions.

(b) Implementation approach for the project. Describe in general how the requirements of the Statement of Work (SOW) will be achieved. Identify potential problems related to this work, and your approach to problem avoidance and/or solution. Address the degree to which your proposed personnel and procedures are proven through similar experience. Describe such things as make/buy strategies, acquisition plans, sparing philosophy, project dependencies, facility requirements, internal review strategies and plans, significant work elements on critical paths, long-lead items, and significant milestones down to at least the lowest level of the WBS. Indicate your needs for additional definition of instrument, spacecraft, and mission, and when this information is required to avoid schedule slippage.

(c) Contractual procedures proposed for the project to effect administrative and engineering changes, describing any differences from existing procedures.

(d) Management techniques to be employed to minimize: 1) project costs and schedule overruns, and 2) risks of violating interface requirements and agreements. Describe associated controls to be exercised over subcontractors and suppliers. Describe how issues will be surfaced in a timely manner and at the proper levels. Identify the Key Technical Parameters the project will use to monitor and report on (see CDRL PM-4) interface compliance and resource status.

(e) The proposed OLI Safety and Mission Assurance organizational structure, including staffing plans, reporting channels, authority and responsibilities, and management visibility. Discuss whether the technical, test, manufacturing and system safety/quality assurance/ reliability/ configuration management personnel required for this project (as indicated in your proposed labor hours) are presently on your payroll and immediately available for this work. State the number and kind of persons who would have to be hired, and plans to obtain them.

(f) A comprehensive schedule plan, which describes the schedule system. This plan shall explain/describe the schedule administration/control. It is the intent of the Government to use the contractor's in-house schedule system as the mechanism for reporting schedule status provided that the schedule control and monitoring system satisfies the deliverable requirements specified in CDRL element PM-2.

This data item shall be submitted in accordance with Table 3-1 of this document.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
PM-12	EXCEPTIONS TO GSFC-STD-1000

3. Reference:

SOW 1.2

4. Use:

Used by the Government to evaluate project compliance with GSFC-STD-1000, "Rules for the Design, Development, Verification, and Operation of Flight Systems."

5. Preparation Information:

The list shall include exceptions to GSFC-STD-1000 Rules, including those exceptions by non-applicability. Each exception shall include a rationale for non-compliance an explanation of any alternative means proposed to address the spirit or intent of the rules, and an estimated cost and schedule impact of providing compliance.

REVIEW DIDS

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
RE-1	INSTRUMENT SYSTEMS REQUIREMENTS REVIEW (ISRR) DATA PACKAGE

3. Reference:

SOW 3.4.5

4. Use:

To evaluate the requirements, requirements flow-down, and the operational concepts and to validate the realism of the functional and performance requirements and their congruence with the system configuration selected to conduct the mission.

5. Preparation Information:

The ISRR Data Package shall discuss contractor system level requirements, rationale, and flow-down plans to lower level requirements.

The ISRR Data Package shall show the allocation and traceability of requirements to major subsystems.

The ISRR Data Package shall cover requirements for the OLI instrument, Ground Support Equipment, flight software, ground test software, and processing algorithm.

The ISRR Data Package shall show how the current concept meets all government specified requirements including interface requirements.

The ISRR Data Package shall discuss the preliminary operations concept of the instrument.

Results of Review—As a result of successful completion of the ISRR, the system and its operation are well enough understood to warrant design and acquisition of the end items. Approved specifications for the system, its segments, and preliminary specifications for the design of appropriate functional elements may be released. For long lead items that are required to be ordered prior to ISRR to meet instrument development schedules, the Contractor shall obtain approval from the Government Contracting Officer prior to ordering these items.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
RE-2	ENGINEERING PEER REVIEW DATA PACKAGE

3. Reference:

SOW 3.4.3

4. Use:

Engineering Peer Reviews (EPRs) focus on the design and implementation details at levels that system-level reviews cannot address. They provide a resource for Design Teams to identify potential engineering design and implementation flaws, and increase the probability of success. Applying the EPR process early and throughout the product life cycle affords the maximum advantage in terms of resource efficiency as well as design confirmation and ultimate mission success.

Review team members are expected to thoroughly penetrate the subsystem functional design and engineering implementation to expose risk areas.

5. Preparation Information:

The EPR is an informal, tabletop review. EPRs should be applied at critical milestones during the design phase, prior to manufacturing or higher level code development, prior to testing, and after completion of subsystem verification. The reviews are essential to assess the integrity of the system design and evaluate subsystem performance relative to the success criteria.

Engineering Peer Reviews address, as appropriate for the timeframe conducted:

A. Design Adequacy: Drawings, Schematics, Analyses, Parts and Materials
B. Manufacturing Adequacy: Facilities, GSE, Personnel, etc.
C. Verification Approach: Test, Analyses, and Simulation
D. Verification Results: Data Adequacy, Observed Margins, Trends, and Anomalies
E. Calibration Approach and Results
F. Claims of heritage from previous missions
G. Lessons Learned

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
RE-3	INSTRUMENT PRELIMINARY DESIGN REVIEW (IPDR) DATA PACKAGE

3. Reference:

SOW 3.4.5
SOW 5.1.2
SOW 5.4.5

4. Use:

To demonstrate the Flight Equipment and GSE design meet the documented requirements.

5. Preparation Information:

The IPDR data package shall contain information to cover the OLI ground algorithm design.

The IPDR data package shall include Science/Technical Objectives, Requirements, General Specification.

The IPDR data package shall include responses to action items from previous reviews, including subsystem PDRs.

The IPDR data package shall include changes since the last review.

The IPDR data package shall address performance requirements and their flow-down to the card or equivalent level.

The IPDR data package shall address system performance budgets.

The IPDR data package shall address error budget determination.

The IPDR data package shall address mass, power, data rate, commands, EMI/EMC.

The IPDR data package shall contain a detailed report of Key Technical Parameters down to a level below the one reported in the MPSR.

The IPDR data package shall address interface requirements, including the following information:

a. Preliminary analysis that will allow the spacecraft contractor to ensure that the "swept" or deployed volume is verified, accounting for all distortions and misalignments.

b. Preliminary estimates of gimbaled masses, inertia's, and to permit sizing the spacecraft control components to meet pointing and stability requirements.

c. Preliminary analysis of disturbances, for decomposition by the spacecraft contractor, of the sum of the instrument-induced periodic disturbance torques, in order to produce the corresponding magnitude spectrum.

The IPDR data package shall address mechanical/structural design, analyses, and life tests.

The IPDR data package shall address electrical, thermal, optical/radiometric design and analyses.

The IPDR data package shall address software requirements, design, and development environment.

The IPDR data package shall address Ground Support Equipment design and work flow, and describe how each item will be fabricated, tested and certified when needed.

The IPDR data package shall address design verification, test flow and calibration/test plans.

The IPDR data package shall address the instrument operations concept.

The IPDR data package shall address parts selection, and qualification.

The IPDR data package shall address preliminary Failure Modes and Effects Analysis (FMEA); Fault Tree Analysis; and reliability analysis and results.

The IPDR data package shall address redundancy and redundancy management.

The IPDR data package shall address single point failures.

The IPDR Data Package shall address the list of long lead items, and of items that may become obsolete prior to completion of all flight instruments, identify those items that must be procured prior to CDR (including a list of those that were ordered prior to IPDR and ISRR), and provide a plan for procuring these items and all parts. For long lead items that are required to be ordered prior to IPDR to meet instrument development schedules, the Contractor shall obtain approval from the Government Contracting Officer prior to ordering these items.

The IPDR data package shall address contamination requirements and control plan

The IPDR data package shall address safety hazards identified for flight, range, ground hardware and operations.

The IPDR data package shall delineate the status of each document required at PDR as to its acceptability for use as is.

The IPDR data package shall address open interface items and the status of the ICD.

The IPDR Data Package shall present all program risks and address their mitigation.

The IPDR Data Package shall provide the status of all sub-contracts and discuss the preliminary design status of critical assemblies and sub-assemblies.

The IPDR Data Package shall present a summary of all breadboard and brassboard testing and present the available test results.

The IPDR Data Package shall present the development status of sub-assembly engineering units, and available test data.

The IPDR Data Package shall present the planned and/or expected level of functionality of the OLI Engineering Development Unit.

The IPDR Data Package shall address the producability of the design solution.

The IPDR Data Package shall address mission assurance to be imposed including parts and materials usage as well and workmanship standards imposed.

The IPDR Data Package shall address software assurance process.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
RE-4	INSTRUMENT CRITICAL DESIGN REVIEW (ICDR) DATA PACKAGE

3. Reference:

SOW 3.4.5

4. Use:

To present the Flight Equipment and GSE design and operation and S/C interface aspects and to demonstrate that all related manufacturing documentation, processes and fixtures are in place before hardware manufacture begins, and to demonstrate that the design meets all performance requirements.

5. Preparation Information:

The ICDR data package shall include responses to action items from previous reviews, including subsystem CDRs.

The ICDR data package shall include changes since the last review.

The ICDR Data Package shall address the procurement status of long lead items and Electrical, Electronic, and Electromechanical (EEE) parts.

The ICDR Data Package shall address manufacturing flow, and the status of manufacturing and assembly drawings, bill of materials, etc.

The ICDR Data Package shall address manufacturing procedures.

The ICDR Data Package shall address mission assurance product checkpoints and evaluation criteria.

The ICDR Data Package shall address standard applicable in-house processes.

The ICDR Data Package shall address special/unique tooling/fixturing.

The ICDR Data Package shall address facilities required for manufacturing.

The ICDR Data Package shall address personnel resources (time phased).

The ICDR Data Package shall address the delivery schedules for flight instruments and GSE.

The ICDR Data Package shall provide:
(a) Performance specification (subsystems and GSE)
(b) Block diagram and description of operation (instrument and GSE)
(c) Schematic and logic diagrams (including waveforms, and timing)
(d) Mechanical configuration drawings

The ICDR data package shall address detailed analysis from FMEA, fault tree analysis, and reliability analysis.

The ICDR Data Package shall address worst case analyses of:
(a) Electrical circuits
(b) Scanning drive system
(c) Lubrication and lubrication loss
(d) Tolerance and tolerance sensitivity analysis (including thermal and mechanical considerations)

The ICDR Data Package shall address stress analyses using NASTRAN with hand verification

The ICDR Data Package shall address thermal analysis of:
(a) Detectors
(b) Telescope
(c) Electronics
(d) In-flight calibrators

The ICDR Data Package shall address weight and power.

The ICDR data package shall contain a detailed report of Key Technical Parameters down to a level below the one reported in the MPSR.

The ICDR Data Package shall address test plans (including all environmental tests)

The ICDR Data Package shall address manufacturing considerations

The ICDR Data Package shall address maintainability considerations, including storage.

The ICDR Data Package shall address materials and processes lists

The ICDR Data Package shall provide a summary of deviations/waivers

The ICDR Data Package shall address contamination control and monitoring considerations

The ICDR Data Package shall address spares program

The ICDR Data Package shall address system safety hazards analyses
(a) Hazards identification matrix
(b) Single point failure summaries
(c) Risk assessment rationale

The ICDR Data Package shall delineate the status of each document as to its acceptability for use as is. If updates and/or changes are required, these shall be estimated in required man-hours.

The ICDR data package shall address open interface items and the status of the ICD.

The ICDR package shall address the instrument operations concept.

The ICDR Data Package shall present any additional test results from breadboard and brassboard testing

The ICDR Data Package shall present the test data from sub-assembly engineering development units and the status of EDU development and testing results, if any.

The ICDR Data Package shall address the development status of all GSE, including test and calibration procedures, and the software/firmware design and operation and interface aspects as evaluated since the IPDR

The ICDR Data Package shall address the status of all program risks and their mitigation

The ICDR Data Package shall address the status of all sub-contract design activity and schedule for delivery of EDU and flight hardware, and demonstrate that designs are complete and have been adequately reviewed. Where approval has been given by the Government Contracting Officer for ordering of long lead items, the Contractor shall address the design/delivery status of these items.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
RE-5	INSTRUMENT PRE-ENVIRONMENTAL REVIEW (IPER) DATA PACKAGE

3. Reference:

SOW 3.4.5

4. Use:

Presents the description and results of the Pre-Environmental Test program, and demonstrates readiness for environmental testing.

5. Preparation Information:

The IPER Data Package shall include status of action items generated at prior reviews

The IPER Data Package shall include analyses and reports required at the review

The IPER Data Package shall include test and integration program descriptions and results

The IPER Data Package shall include failure report summaries including status of action and rationale for closure

The IPER Data Package shall include as-built documentation summary

The IPER Data Package shall include results of the functional and interface tests

The IPER Data Package shall include descriptions of any malfunctions and corrective actions

The IPER Data Package shall include comparison of measured performance with requirements and discussion of the effect of any variance and waivers

The IPER Data Package shall include mission operation constraints

The IPER Data Package shall include contamination avoidance requirements

The IPER Data Package shall include safety requirements

The IPER Data Package shall include list of spares for flight equipment and GSE

The IPER Data Package shall include review of instrument handling procedures

The IPER Data Package shall include spacecraft interface concerns, problems and solutions, including:

a. Analysis and test data that will allow the spacecraft contractor to ensure that the "swept" or deployed volume is verified, accounting for all distortions and misalignments.

b. In electronic format, time/magnitude plots of their disturbances, for decomposition by the spacecraft contractor, of the sum of the instrument-induced periodic disturbance torques, in order to produce the corresponding magnitude spectrum.

The IPER Data Package shall include orbital operations plans and status of documentation and databases.

The IPER Data Package shall include end-item data packages (submit a summary of the content prior to review and have package available for inspection at review)

1. As-built configuration list
2. Hardware parts lists
3. Hardware materials and processes lists
4. Test Log Book (including total operating time and cycle records)
5. Open item lists (including reasons for being open)
6. Safety compliance data package
7. Limited life items listings and status
8. Critical parameters trend data
9. Final comprehensive performance test results

The IPER Data Package shall discuss the compatibility of instrument with spacecraft flight support equipment, ground support equipment and operational ground equipment

The IPER Data Package shall address the availability and readiness of facilities and GSE required for environmental testing

The IPER Data Package shall address the status of all program risks and their mitigation plans.

The IPER Data Package shall address the readiness of environmental test plans and procedures

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
RE-6	INSTRUMENT PRE-SHIP REVIEW (IPSR) DATA PACKAGE

3. Reference:

SOW 3.4.5
NPOESS GIID IF234720
NPOESS GIID IF230670

4. Use:

To evaluate system performance during qualification or acceptance testing, and evaluate readiness to ship from contractor.

5. Preparation Information:

This data package shall address, as a minimum:

The IPSR Data Package shall address responses to action items generated at prior reviews

The IPSR Data Package shall address the solutions to all problems encountered during the environmental test and validation program and the solution rationale.

The IPSR Data Package shall address any rework/replacement of hardware, regression testing, and test plan changes.

The IPSR Data Package shall address compliance with the test verification matrix

The IPSR Data Package shall address measured test margins versus requirements.

The IPSR Data Package shall address qualification/acceptance temperature margins

The IPSR Data Package shall address any data that has been trended to identify compliance with specification, indicating a change or drift to the trend.

The IPSR Data Package shall address total failure-free operating time of the item

The IPSR Data Package shall address the results of the final audit of any remaining drawing

changes.

The IPSR Data Package shall address “could-not-duplicate failures” along with assessment of the problem and the residual risk that may be inherent in the item

The IPSR Data Package shall address project assessment of any residual risk

The IPSR Data Package shall provide an update from CDR on shipping containers, monitoring/transportation/control plans

The IPSR Data Package shall address ground support equipment status

The IPSR Data Package shall address post shipment plans

The IPSR Data Package shall address spacecraft integration plan.

The IPSR shall address the plans for storage of the instrument.

The IPSR Data Package shall address launch preparation plan (for Flight Models)

The IPSR Data Package shall address approval of safety status for flight, range, ground hardware and operations

The IPSR Data Package shall include documentation verifying that the instrument does not outgas at a rate greater than that specified in the Spacecraft-to-Instrument ICD.

The IPSR Data Package shall include alignment data relative to the Instrument Boresight and the mounting surface datum(s) associated with the instrument.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
RE-7	DATA IN SUPPORT OF MISSION LEVEL REVIEWS

3. Reference:

SOW 3.4.6

4. Use:

Provide OLI information to the lead entity in support of mission level reviews.

5. Preparation Information:

Provide documentation, and information in support of the mission contractor for Mission level reviews, such as PDR, CDR, PSR, FOR, MOR, ORR, MRR, FRR, LRR, IOCR

SOFTWARE DIDS

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SW-1	SOFTWARE DEVELOPMENT AND MANAGEMENT PLAN

3. Reference:

SOW 5.4.1

4. Use:

Defines contractor activities required to develop and manage software

5. Preparation Information:

Topics to be included in the Software Development and Management Plan are:

A. Purpose and Description;
B. Resources, Budgets, Schedules, and Organization;
C. Acquisition Activities;
D. Development Activities;
E. Sustaining Engineering and Operations Activities;
F. Quality Assurance;
G. System safety;
H. Risk Management;
I. Configuration Management;
J. Delivery and Operational Transition
K. V&V and IV&V;
L. COTS, GOTS, and MOTS software.

Additionally, the Contractor shall evaluate all flight software for the OLI using software metrics. The metrics collected, trended, and presented monthly. Metrics shall include at a minimum:

A. Number of flight software requirements and their change status
B. Design/Code complexity index at CSU, CSC, and CSCI levels
C. Source code production rate estimates versus actuals
D. Number of Software Change Requests/Problem Reports and their status
E. Resource margins for Utilization of memory, CPU, I/O Bandwidth and Bus traffic
F. Effort data (staffing profile) estimates versus actuals

Include an alphabetized list of definitions for abbreviations and acronyms used in this document. Include an alphabetized list of definitions for special terms used in the document, i.e., terms used

in a sense that differs from or is more specific than the common usage for such terms.

Material that is too detailed or sensitive to be placed in the main body of text may be placed in an appendix or included as a reference. Include the appropriate reference in the main body of the text. Appendices may be bound separately, but are considered to be part of the document and shall be placed under configuration control as such.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SW-2	OLI DATA FORMAT CONTROL DOCUMENT

3. Reference:

SOW 5.4.1

4. Use:

For the interface with the spacecraft, the ground processing, and the science community to ensure a full understanding of the data.

5. Preparation Information:

The Contractor shall provide LDCM Data Format Control Documents that provide detailed data format and content of the specific OLI image data and ancillary data files as stored on the DSAP and specific detailed data formats and outputs of the DSAP for OLI data transferred via the DSAP SMD and Direct Downlink interfaces.

The DFCD also includes detailed bit definitions, command, meta and ancillary data definitions for all OLI telemetry and command data between the spacecraft and OLI and its subsystems.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SW-3	SOFTWARE DESIGN DOCUMENT/USERS GUIDE

3. Reference:

SOW 5.4.1

4. Use:

Describes the software design and operation for use by software maintenance team.

The Software Design Document describes in detail the architecture, structure, and organization of a particular Computer Software Configuration Item (CSCI), decomposing the top-level CSCI into Computer Software Components (CSC) and lower levels of units as appropriate. The SDD describes each unit of software in terms of its interfaces (input/output), data architectures, and processing (e.g. logic, algorithms).

The Software Users Guide shall contain the information required to use the software, including detailed procedures and functionalities

5. Preparation Information:

Provide a system level design overview that contains:
(a) Design Methodology
(b) Design Overview
(c) Design Studies
(d) Design Issues
(e) Hardware Interface

Provide a system design description that contains, at a minimum
(a) Subsystem Description for each subsystem
(b) Software Description for each software component
(c) Software Interface Control Description for both software-to-software and software-to-hardware interfaces

Describe the system operations design, including:
(a) Operations Scenarios
(b) User-System Interface
(c) Operations Environment and Facilities

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SW-4	SOFTWARE TEST READINESS REVIEW (SWTRR) DATA PACKAGE

3. Reference:

SOW 5.4.4

4. Use:

Presents the description and results for the S/W and System Integration/Test program.

5. Preparation Information:

This design review package shall address, as a minimum:

A. All documentation as called for in the Software Development and Management Plan
B. Test and Integration program descriptions and results
C. Software test results
D. Failure report summaries including status of action and rationale for closure
E. As-built documentation summary

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SW-5	SOFTWARE ACCEPTANCE REVIEW (SWAR) DATA PACKAGE

3. Reference:

SOW 5.4.4

4. Use:

For review of all test data and designs for compliance against specification requirements, variances, mission operations requirements, etc.

5. Preparation Information:

This data package shall address, as a minimum:

A. Results of the functional and interface tests
B. Malfunctions and corrective actions
C. Reliability predictions
D. Comparison of measured performance with requirements and discussion of the effect of any variance and waivers
E. Mission operation constraints
F. Safety requirements
G. Maintenance and operation manuals
H. Interface concerns, problems and solutions
I. Compatibility of instrument with spacecraft flight support equipment, ground support equipment and operational ground equipment

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SW-6	GSE SOFTWARE TEST READINESS REVIEW (GSWTRR) DATA PACKAGE

3. Reference:

SOW 5.4.4

4. Use:

Presents the description and results for the S/W and System Integration/Test program.

5. Preparation Information:

This design review package shall address, as a minimum:

A. All documentation as called for in the Software Development and Management Plan
B. GSE Test and Integration program descriptions and results
C. GSE software test results
D. Failure report summaries including status of action and rationale for closure
E. As-built documentation summary

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SW-7	FLIGHT SOFTWARE TEST PLAN

3. Reference:

SOW 5.4.1

4. Use:
Provide overall view of the instrument's software acceptance test program detailing test philosophy objectives and rationale for all software testing and hardware/software integration activities planned for the program.

5. Preparation Information:

This shall incorporate the requirements of the MAR.

This shall include, as a minimum:

A. Tests to be accomplished to demonstrate that the software meets requirements
B. Test environment
C. Required test data
D. Expected results
E. Test schedules
F. Special operating conditions (if required)

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SW-8	SOFTWARE TEST PROCEDURES

3. Reference:

SOW 5.4.1

4. Use:

To define the software test procedures.

5. Preparation Information:

These software test procedures shall be prepared to implement software testing as required in accordance with the MAR.

As a minimum these procedures shall define the objectives, test requirements, test limits, pass/fail criteria, test fixtures and instrumentation, handling procedures, environment, and test recording requirements.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SW-9	SOFTWARE TEST REPORTS

3. Reference:

SOW 5.4.1

4. Use:

Provide summary of the software acceptance testing and/or retesting activities

5. Preparation Information:

These reports shall be prepared in accordance with the OLI MAR.

These reports shall be developed for each test described in the Software Test Plan and shall include the following, as a minimum:

A. Version number of software tested
B. Identity and number of planned tests that have been completed
C. Conformance of test results to expected results
D. Number, type, and criticality of discrepancies
E. Identification of software areas tested
F. Analysis of any performance requirements that the tested software could affect
G. Test result summary

DESCRIPTION OF REQUIRED DATA

1. CDRL No.: SW-10

2. Title: SOFTWARE DELIVERY PACKAGE

3. Reference:

SOW 5.4.1
SOW 5.4.5

4. Use:

A software delivery package is required with submittal of each software release for GSFC acceptance. There are three items comprising the software delivery package. The first item is the delivery letter describing what is being delivered. The second item is the software on appropriate media. The third item is accompanying documentation.

5. Related Documents:

6. Preparation Information:

A software delivery package is required prior to submittal of each software release for GSFC acceptance. The software delivery package shall include the following information with appropriate approvals:

A. Software Delivery Letter, one page in length, which defines briefly what is being delivered, contains in its attachments the details of the delivery, and identifies a point of contact for resolution of questions/misunderstandings/problems involving the delivery. Attachments which support the delivery letter are described in items (a) through (k) below:

   (a) Description of Delivery Contents – Identify the delivery in terms of subsystem, release number(s), configuration ID(s), media type(s) (tapes, diskettes, other) and number of copies.

   (b) Build Instructions - Provide instructions to be used in building the delivered software, including the version number of system or vendor-supplied software required to build the system. The supplier should provide evidence that these instructions have been executed prior to delivery and that the software has been built successfully using them (As Built Configuration).

(c) Special Operating Instructions – Indicate any special instructions that test or operations personnel need to know in using the software. These may include, for example, the use of special simulators, changes to operational procedures, the addition of new files, file format changes, operating constraints/limitations, workaround resolutions to documented problems, operational software version numbers, and associated database version numbers.

(d) List of Resolved Anomaly Reports and Change Requests.

(e) List of Unresolved Anomaly Reports and Change Requests.

(f) Copy of Resolved Anomaly Reports and Change Requests.

(g) Copy of Unresolved Anomaly Reports and Change Requests.

(h) Matrix of requirements addressed by this release (may be done by reference to mapping of requirements identified in requirements specification document).

(i) Release History Summary Matrix.

(j) Inventory of the Delivered Media – Produce the inventory from the media themselves,

(k) List of Release Documentation, e.g. users guide procedures.

B. Software Delivery Media

The second of the three items of the delivery package is the delivered software, including the source code and executable code. Provide this software on the media in accordance with the contract schedule. The media can be magnetic disk, magnetic tape, optical media, paper listings, etc. Number of copies of the media is in accordance with the contract schedule.

C. Accompanying Documentation

The third and final item included in the software package is the documentation that describes the delivered software. Provide copies of the following:

(a) Users Guide.

(b) Software Description

(c) Requirement(s) Documentation or draft change pages.

(d) Design Documentation or draft change pages.

(e) Data Definitions

(f) Test Plans, Procedures and Results as appropriate.

INTEGRATION AND TEST DIDS

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
IT-1	SPARE PARTS PLAN

3. Reference:

SOW 11.0

4. Use:

To review contractor's spares list.

5. Preparation Information:

The Spares Parts Plan shall define and justify the contractor's position for the spares proposed for the OLI program, including the flight models, Engineering Development Unit, and emulators. This plan shall also present the schedule and method for obtaining the spares. The Plan shall provide a listing of Spare Parts. For the purposes of this CDRL, the contractor should concentrate on parts that are not commonly available, or may cause schedule problems if out of stock.

Further, this plan shall address all of the requirements of the SOW.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
IT-2	COMMAND AND TELEMETRY LIST AND DESCRIPTION

3. Reference:

SOW 5.4.2

4. Use:

For determining the commands required for instrument operation and the definition of all instrument telemetry data

5. Preparation Information:

This shall contain a complete list of instrument commands for all instrument modes of operation and sequence testing with a description of their effects, and it identifies any critical commands which may damage the instrument in certain situations.

This shall contain a complete list of engineering telemetry data coming from the instrument, including engineering telemetry calibrations, the levels or responses expected in response to commands, and levels which require alerts or immediate actions.

The contractor shall generate a Telemetry & Command Handbooks (T&C) Vol 1 and Vol 2 where:

Vol 1 is formats, (e.g, How CCSDS is Implemented, frame headers etc.)

The Contractor shall accept inputs from the spacecraft contractor for this volume.

Vol 2 is the telemetry and commands descriptions including thresholds, conversion, etc.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
IT-3	DETAILED TEST PROCEDURES

3. Reference:

SOW 5.3.3
NPOESS GIID IF235180

4. Use:

- Provide detailed procedures required to integrate subsystem components into the OLI instrument.
- Provide detailed procedures required to perform subsystem, system tests.
- For defining test procedures for establishing Instrument and GSE compliance to OLI specifications.
- Provide detailed procedures required to perform instrument testing at the spacecraft level.

5. Preparation Information:

Each procedure shall be prepared in accordance with the MAR and shall include, as a minimum:

A. Nomenclature and identification of the test article. Identification of test configuration and any differences from flight configuration
B. Identification of objectives and criteria established for test by the applicable verification plan or specification. Where tests are run by computer program, the applicable test specification and computer program subroutine number must be identified
C. Characteristics and design criteria to be inspected or tested, including values for acceptance and rejection, with actual date of the test recorded
D. Layout and interconnection of test equipment and articles including the grounding scheme. Location and identification of all measuring points on appropriate schematics and diagrams
E. Description of integration tests planned for each subsystem, instrument and interrelationship verification testing
F. Planned use of GSE, breakout boxes, simulators, etc.
G. Hazardous situations and operations and abort conditions
H. Environmental and/or other conditions to be maintained, including contamination controls

I. Responsibilities and chain-of-command for test performance
J. A tabulation of (1) all test target temperatures for all equipment in thermal vacuum, and (2) all predicted test temperatures for all equipment in thermal balance
K. Time ordered sequence of steps to perform the test or activity.

These procedures should define expected results in telemetry and associated caution and warning levels.

Test scripts (executable procedures) to be used at the spacecraft level shall be in (TBD NGST) format.

Test procedures for use at the integrated spacecraft level shall identify all constraints, including commands that pertain to each test environment, including testing while encapsulated at the launch pad.

Describe all procedures to be used at Goddard Space Flight Center facilities, spacecraft vendor facilities, any other integration facilities and the launch site for all hazardous operations as well as the procedures to control them. Procedures at the launch site shall comply with the launch site requirements.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
IT-4	PACKAGING, HANDLING, STORAGE, AND TRANSPORTATION (PHS&T) PLAN AND PROCEDURES

3. Reference:

SOW 6.1
MAR 2.3
NPOESS GIID IF234425

4. Use:

Provide the instructions and procedures for safe and effective packaging, handling, storage, and transporting of OLI and associated GSE throughout the mission contract.

5. Preparation Information:

This documentation shall discuss the plan and all of the step-by-step procedures for the packaging, handling, storage, and transporting of OLI, spares, and GSE. The documentation shall include:

A. Nomenclature of all supportive equipment
B. Calibration and load-tested data
C. Identification of special environmental conditions, such as cleanliness, temperature, humidity, etc., and the controls to be implemented to maintain those conditions
D. Format for recording QA stamp, deviations and approval columns
E. Requirements for special tools, equipment, special handling fixture and containers, including:
    a. Specific procedures for use of instrument protective covers.
F. Method of transportation and carrier
G. Procedures to comply with local, state and federal safety requirements
H. Procedures for maintaining contact with the transported item.

These shall be prepared in accordance with the MAR.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
IT-5	STORAGE TESTING PROCEDURES

3. Reference:

SOW 5.5

4. Use:

For defining procedures to be used for instrument storage testing.

5. Preparation Information:

As a minimum, these procedures shall define the objectives, test requirements, test limits, test intervals, test fixtures and instrumentation, GSE, handling procedures, environment, and test recording requirements.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
IT-6	OLI TO SC INTEGRATION PROCEDURE INPUTS

3. Reference:

SOW 6.3

4. Use:

To provide to the spacecraft contractor the methods to be used for integrating the OLI instrument to the spacecraft, including safe-to-mate, signal characterization tests, and any other integration/alignment activity specified in the OLI to Spacecraft ICD.

5. Preparation Information:

These procedure inputs shall provide step-by-step instructions, including top assembly view and an exploded view of how the instrument is to be mounted to the spacecraft. Identify test measurements to be made and recorded at different assembly levels, handling and environment requirements, and photographic recording. These procedure inputs shall identify any fixtures needed for integration.

Identify all fixtures, GSE, and handling requirements that are required for integration onto the spacecraft and to support spacecraft level testing.

CALIBRATION/VALIDATION DIDS

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
CV-1	CALIBRATION/VALIDATION PLAN

3. Reference:
SOW 4.1.d
SOW 5.3.3

4. Use:

Controlling document for definition of calibration requirements, equipment and methods.

5. Preparation Information:

The Contractor shall provide a Calibration/Validation Plan for the OLI System that describes the approach for characterizing the spectral, spatial, radiometric and geometric performance of the OLI, ensuring that the OLI and OLI data products satisfy the OLI Specification requirements. The Calibration/Validation Plan shall incorporate the requirements of the Special Test Requirements (STR) document.

The Calibration/Validation Plan shall incorporate the following information at a minimum:

A. A description of planned tests including:
   (a) what is being tested and how it relates to instrument performance and the data specification
   (b) integration level for test, i.e. part, subassembly, assembly, instrument, spacecraft
   (c) environmental conditions for test, e.g. ambient, thermal-vacuum, on-orbit
   (d) operational phase of testing, i.e. pre-launch, or post-IOC
   (e) theoretical basis for the test (how the test is performed, how the data are reduced and why it is done this way-equations and physics)
   (f) the resolution, precision and accuracy of the results
   (g) test equipment and setup
   (h) description of test results usage, i.e. processing algorithms that use test results or calibration parameters generated by the test
B. A test schedule and flow chart
C. How test results are made available
D. Government access and participation in pre-launch testing including a GFE transfer

radiometer/Earth Observing System (EOS) radiometric scale realization activities and any government diffuser BRDF characterization activities

E. Description of COTS and custom analysis tools
F. A description of the On-Orbit Calibration capabilities of the LDCM sensors, their design, how they are characterized, and how they are used
G. Reference Standards and their calibration traceability
H. Support data requirements, e.g. GCP, DEM, reference images

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
CV-2	CALIBRATION/VALIDATION PROCEDURES

3. Reference:

SOW 5.3.3

4. Use: To verify that the planned procedures meet the goals of the Calibration/Validation Plan.

5. Preparation Information:

The Contractor shall provide Calibration/Validation procedures for each planned test. The procedures shall minimally include step-by-step instructions, test equipment and calibration reference requirements, assumptions, associated algorithms, analysis techniques, expected results, output data format, and pass/fail criteria. Descriptions of each test shall include (at a minimum): test facilities, mechanical & electrical ground support equipment, stimuli, levels, durations, configurations, sequence of events, and trending of performance characteristics during verification testing.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
CV-3	CALIBRATION/VALIDATION TEST REPORT

3. Reference:

SOW 5.1.1.7
SOW 5.3.3

4. Use: To provide results of calibration/validation tests for Government review.

5. Preparation Information:

The Contractor shall provide a Calibration/Validation Test Report for each planned test or validation. All supporting data shall be provided in electronic format, where applicable.

The Calibration/Validation Reports shall include at a minimum:

A. Identification of test article or component with date of test
B. Performance trends during and between each planned test
C. Problems or failures with tests or procedures
D. Anomalies and deviations from plans or procedures
E. Test results, including any calibration parameters to be used for on-orbit processing and comparison of results with expectations and requirements

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
CV-4	CALIBRATION/VALIDATION SUMMARY REPORT

3. Reference:

SOW 5.3.3

4. Use: These reports shall be designed to serve as instrument calibration references for current and future users of the LDCM data set.

5. Preparation Information:

The Contractor shall provide a Calibration/Validation Report in two phases. The Pre-Ship report shall describe the pre-ship calibration process and results. the Post-Launch Report shall describe the calibration process and results from launch to IOC. Each shall document the state of the instrument calibration relative to the OLI Specification. The reports shall include details of any anomalies affecting the data, descriptions of the instrument calibration and characterization tests, references to the test reports from DID SE-4, and long term trending results. The Post-Launch Report shall include any changes to the calibration parameters and algorithms during the Commissioning period.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
CV-5	RADIOMETRIC MATH MODEL

3. Reference:

SOW 5.1.1.2

4. Use:

For evaluating the end-to-end radiometric performance of the instrument; for allocation of error budget, etc.

5. Preparation Information:

A. The Radiometric Math Model shall be used to evaluate the end-to-end radiometric performance of the OLI instrument; conduct sensitivity analyses; determine absolute and relative calibration accuracies; identity major error contributors which can be eliminated during the design phase; identify impact of error budget trades; assess instrument performance in terms of Signal to Noise Ratio (SNR), Noise Equivalent Radiance (NEΔL), stability in orbit, etc.

B. The model shall be related to actual test and calibration data; the model shall be updated and refined during the course of the OLI development program until it simulates instrument performance accurately.

C. Also to be included in the model are on-board and preflight ground laboratory calibration algorithms and a data book that contains all pertinent estimated measured data required by the calibration algorithms. The estimated data shall be replaced with measured data when it is available. The on-board calibration algorithms are used along with ground calibration data to demonstrate that the absolute and relative radiometric accuracies are being met. The calibration data shall also be provided in a mutually agreed upon computer-compatible form.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
CV-6	OLI OPTICAL ANALYTICAL MODEL

3. Reference:

SOW 5.1.1.5

4. Use:

For evaluating the end-to-end geometric and spatial performance of the instrument, allocation of error budgets, and to provide a framework for thermal and mechanical sensitivity analyses.

5. Preparation Information:

1) Component Models

a) Focal Plane Model

Describe the size, shape, and placement of the detectors on the focal plane, including how the detectors are grouped by band and, if applicable, sensor chip assembly. Describe how detector focal plane location can be determined as a function of detector number, chip number, and band number. Show how the detector layout and sampling combine to provide complete coverage of the ground target area. Present a model of detector spatial response that includes the effects of detector size, shape, and integration time.

b) Optical Model

Describe the key parameters of the optical system such as Cardinal Points, FOV, and 5^{th} order aberrations modeling, in a static nominal setting. Define the optical axes of the system and present a geometrical model of the optics that shows how locations in the instrument focal plane are mapped to directions relative to the optical axes. Present a model of the spatial response of the optical system (i.e., MTF). Provide a tolerance analysis that quantifies the effects of physical shifts of any static or dynamic components in the optical system, and physical differences in fabricated components from design requirements (i.e. radius of curve, index, coating quality, centeration, polished surface finish) on the geometrical and spatial models.

c) Mechanism Models

Geometrically characterize and model any dynamically moving part/s in the optical system such as a scanning/pointing mechanism, and/or a yaw steering table/mirror showing how any telemetry characterizing the operation of each mechanism is used to determine its effect upon the imaging geometry. Include an analysis of the effects of

mechanical jitter on the instrument line of sight including a description of the methods used to compensate for jitter using vibration sensors and ground processing.

2) Dynamic Models

a) Thermal Sensitivity Model

Use the results of the instrument thermal model to analyze the expected variations in the component models with temperature.

b) Vibration Sensitivity Model

Analyze the sensitivity of the component models to vibration and use the results of the instrument structural model to predict the expected variations in the component models in the operational vibration environment.

3) Performance Models

a) Spatial Performance

Combine the component and dynamic models to construct an integrated model of end-to-end spatial response that can be used to analyze and predict instrument edge response performance. Include spacecraft-induced vibration and orbital and seasonal thermal effects in the results of the model.

b) Geometric Performance

Combine the component and dynamic models to construct an integrated instrument geometrical line of sight model that can be used to analyze and predict line of sight knowledge and stability performance. Include spacecraft-induced vibration and orbital and seasonal thermal effects in the results of the model.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
CV-7	ALGORITHMS AND CALIBRATION PARAMETERS

3. Reference:

SOW 5.1.1.1

4. Use:

Algorithms for determination of instrument calibration from pre-launch and on-board calibration devices and pre-launch calibration parameters are required for image processing

5. Preparation Information:

Required algorithms:

A. For processing of solar diffuser data to absolute calibration coefficients
B. For determination of diffuser degradation based on the diffuser stability monitor
C. For determination of each detectors dark response during earth image acquisition based on the dark pixels and dark data acquired before and after the earth acquisition.
D. For determination of detector response based on the internal lamp system
E. For determination of radiometric stability through launch using the transfer to orbit on-board calibration devices
F. For usage of any other calibration devices
G. For computing a line of sight relative to the instrument optical axes for each detector on the OLI focal plane.
H. For transforming detector lines of sight relative to the instrument optical axes to lines of sight relative to the instrument mounting surface using data from instrument jitter sensors and/or yaw steering mechanisms as required.

Required Calibration parameters:

A. Pre-ship detector by detector absolute gains that meet the detector to detector uniformity and absolute accuracy requirements
B. Pre-ship detector bias estimates
C. Coefficients characterizing detector gain and bias sensitivity to temperature
D. List of dead, inoperable and out-of-spec detectors
E. Line of sight angles and/or apparent (i.e., including the effects of optical distortion) detector locations relative to the OLI optical axes for each detector on the OLI focal

plane.

F. Orientation/alignment matrix relating instrument jitter sensors to the OLI optical axes.
G. Scaling coefficients that convert jitter sensor counts to angular displacement.
H. Transfer functions describing the sensitivity of the jitter sensors to vibration as a function of frequency.
I. Scaling coefficients and/or alignment matrices that describe the orientation of the instrument optical axes relative to the instrument mounting surface as a function of yaw steering mechanism position, if yaw steering is accomplished mechanically.
J. For calibrating the output of any OLI-mounted attitude and/or jitter sensors.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
CV-8	LINE-OF-SIGHT PROCESSING ALGORITHMS

3. Reference:

SOW 5.1.1.7
OLI Specification 3.3.2

4. Use:

The Contractor shall provide the algorithms used for the demonstration required in SOW paragraph 5.1.1.7.

5. Preparation Information:

The Contractor shall provide:

a. An overview of the algorithms including the objective or purpose of the algorithms
b. The rationale for the algorithms and the specifications they support
c. A description of any external ancillary data (i.e. from the spacecraft) used by the algorithms
d. A description of the algorithm outputs
e. A mathematical description of the algorithms
f. An error analysis showing the expected accuracy of the algorithm results
g. A description of the methods used to validate the algorithms
h. A list of the OLI data components used by the algorithms
i. A list of the calibration parameters used by the algorithms
j. A list of references

SYSTEMS ENGINEERING DIDS

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SE-1	CONFIGURATION CHANGE REQUESTS (CCR) CLASS I

3. Reference:

SOW 3.3
MAR 2.2.3

4. Use:

Class I changes are to be used as a vehicle for orderly processing of change requests to appropriate level of approval authority for disposition.

5. Preparation Information:

Consistent with the contractors' Configuration Management Plan (CMP), the contractor shall prepare Class I Change Requests for changes classified as Class I. Class I and Class II changes are defined as follows:

a) Class I changes

A change shall be classified Class I when one or more of the items listed below is affected:

a. Baselined documentation (except for typographical errors or clarification).
b. Technical requirements of the product (form, fit, or function).
c. Contract end items/requirements (cost or schedule).

Class I changes shall be submitted for CCB approval and should be limited to those which are necessary or offer significant benefit to the Government.

b) Class II changes

A change may be classified Class II when it does not fall within the definition of a Class I change as given above. Examples of Class II changes are:

a. A change in documentation only (for example, correction of errors, addition or clarifying notes or views).
b. A minor change in hardware (for example, substitution with an approved alternative

material) which does not affect any item listed under Class I changes.

c. Drawing changes that do not affect a baseline, interface, etc.

Class II changes normally do not require project CCB approval unless they are written against project CM-controlled documents.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SE-2	CONTRACTOR - GENERATED INTERNAL TECHNICAL INFORMATION

3. Reference:

- SOW 3.1

4. Use:

To document technical information and decisions related to the OLI program.

5. Preparation Information:

This memoranda shall be typed or hand-printed and may contain hand-drawn sketches to preserve informality and timeliness.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SE-3	ENGINEERING ANALYSES & TEST REPORTS

3. Reference:

SOW 4.2
SOW 4.3

4. Use:

- To aid in making judgments and decisions regarding numerous specific technical subjects relative to the OLI instrument and GSE design. These analyses shall be reviewed periodically through the program both formally (design reviews), and informally (with GSFC Contract Officer Technical Representative - COTR).
- For review of tests and test results obtained from engineering tests performed on the instrument or instrument subsystems.

5. Preparation Information:

Analyses:
Formal documentation of these analyses, herein called Engineering Analyses Reports (EARs), is required for the design reviews (data package); however, to aid the informal coordination and design monitoring/review with the GSFC team, the Contractor shall supply advance copies of these analyses to the COTR. Formally released EARs shall be delivered on a timely basis - i.e., as they are completed. Each EAR shall be typed but may contain hand-drawn sketches to preserve informality and timeliness. The Contractor, at his discretion, may use the EARs directly or indirectly, as appropriate, to supplement formal documentation requirements so as to avoid unnecessary duplications of effort.

A partial list of EARs follows and may be amended with the mutual consent of the contractor and the COTR. Similarly, the schedule due dates for each of these EARs shall be mutually agreed upon.

Partial list of EARs includes:

A. Thermal analysis and design

B. Analysis of in-flight calibration techniques, accuracies and expected changes over lifetime

C. Analysis of polarization sensitivity, how to minimize, achieve, and demonstrate

D. Analog amplifier analysis (stage-by-stage, each channel to include SNR, bandwidth, gain, stability, etc.)

E. Logic and timing circuits - functional description, timing diagrams

F. Possible cost savings, increased cost-effectiveness (end of design definition phase)

G. Mechanical-structural analysis and design (Technique used for analysis shall be mutually agreed upon by contractor and COTR)

H. Analysis of bearing-to-housing fits, tolerances, thermal effects

I. Results of computer analysis of beam alignment design, tolerances and error budget

J. Scan motor torque analysis

K. Review of how the spacecraft contractor will align and periodically check the alignment of the OLI to the spacecraft

L. Detailed analysis of power requirements and power profile. Following the initial systems review a summary updated chart or table shall be supplied monthly.

M. Detailed weight breakdown analysis, as well as a summary to be updated monthly following initial systems review showing the changes, reasons, and differentiation between calculated, estimated or actual weights

N. Analysis of expected scan linearity and jitter

O. Worst case performance analysis of all mechanical, electrical and optical systems with regard to radiation, age, voltage, and temperature extremes, etc.

P. Analysis of instrument contamination sources, impact on instrument performance, and mitigations.

Test Reports:
These reports shall identify, as a minimum, the test requirements, test limits, test fixtures environment, test equipment, test results, and any failures and corrective actions.

These reports shall be developed for each test and shall include the following, as a minimum:

A. Identity and number of planned tests that have been completed

B. Conformance of test results to expected results

C. Number, type, and criticality of discrepancies

D. Identification of software areas tested

E. Analysis of any performance requirements that the tested software could affect

F. Test result summary

The actual test results shall either be attached to the report(s) or maintained on-site.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SE-4	TREND ANALYSIS (LIST AND REPORTS)

3. Reference:

MAR 4.5.1
SOW 4.1.f

4. Use:

Provides a list of critical engineering and performance parameters for the OLI instrument.
Tracks critical engineering and performance parameters for the OLI instrument.

5. Preparation Information:

The developer shall assess all subsystems and components and provide a list identifying key parameters that relate to performance stability. Starting at component acceptance testing and continuing during the system integration and test phases, these parameters are to be monitored for trends leading toward degradation of performance or reliability of OLI.

The monitoring shall be accomplished within the normal test framework; i.e., during functional tests, environmental tests, etc. The developer shall establish a system for recording and analyzing the parameters as well as any changes from the nominal even if the levels are within specified limits. Results to be reviewed with operational personnel prior to launch. Trends should be recorded through launch plus 3 months, or until the end of on-orbit verification.

In addition, for each mission, a log shall be maintained for each instrument of the accumulated operating time. The log shall include the following information, as a minimum:

A. Identification of hardware item
B. Serial number
C. Total operating time since assembly as a unit
D. Total operating time since last failure
E. Total additional operating time projected for the unit prior to launch
F. Identification of key parameters being monitored
G. Upper/lower spec tolerance limit for each parameter being monitored
H. Summary statement of any trending noted in earlier measurements of each parameter
I. Observed value (in sequence) for the reporting interval
J. Assessment of trends to date

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SE-5	STRUCTURAL MATH MODEL

3. Reference:

SOW 5.1.1.4
NGIID 4.2.4

4. Use:

For providing instrument interface information to be utilized in various static and dynamic spacecraft analyses.

5. Preparation Information:

A simplified structural math model shall be prepared approximating the mass, interface and first structural mode of the instrument.
The deliverable OLI Structural Math Model shall meet all requirements of the NPOESS GIID, section 4.2.4. In addition to these requirements, the math model shall be compared with a modal survey carried out on the Structural/Thermal Model to verify frequency and mode shape predictions of the structural math model. The frequency predictions shall agree with the modal survey results to within 5 percent for the first mode and 10 percent for all other significant modes up to 100 Hz. In addition to the frequency correlation, the mode shape correlations between test and the analytical model shall include a cross-orthogonality check, a mode shape geometric similarity check, and a static deflection check. The final update of the structural math model shall include any modifications required to correlate the model to the physical test results.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SE-6	THERMAL MATH MODEL

3. Reference:

SOW 5.1.1.3
NPOESS GIID 4.2.4

4. Use:

To evaluate the thermal performance of the instrument and to define the thermal loads at the instrument/spacecraft interface.

5. Preparation Information:

The model shall be composed of at least 250 nodes. The Thermal Math Model shall have sufficient detail of all subsystems and critical interfaces to accurately predict absolute interfaces. These models shall be verified and refined after comparison with thermal test data.

The Contractor shall also develop reduced thermal models in accordance with the NPOESS GIID.

SINDA-compatible and TRASYS-compatible reduce, node versions of the full instrument thermal math model, appropriately documented, are required for analytical integration with the spacecraft. A users guide shall be provided for deliverable math models.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SE-7	WIRING DIAGRAMS

3. Reference:

SOW 4.1.b

4. Use:

For definition of all wire flows of the instrument electronics.

5. Preparation Information:

These wiring diagrams shall cover the system, subsystem, component electronics and GSE. It shall identify each wire by its classification:

- Ground
- Signal
- Power

The diagrams shall trace each wire's runs identifying all path connections (by connector/pin number). Wire designators shall be clearly delineated for legibility.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SE-8	APPROVED OR CONTROLLED DRAWINGS

3. Reference:

SOW 4.1.b

4. Use:

For evaluating OLI development and for use as anomaly resolution tools during operation.

5. Preparation Information:

As a minimum, this information shall consist of all drawings under configuration control including mechanical drawings, electrical schematics, logic diagrams, and block diagrams. The logic diagrams shall cover the system, subsystem and component electronics and shall identify the signal inputs and outputs, internal signal flow, and the next level external connections.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SE-9	SYSTEM PERFORMANCE VERIFICATION PLAN

3. Reference:

SOW 5.3.2; MAR 9.2.1

4. Use:

Provides the overall approach for accomplishing the verification program. Defines the specific tests, analyses, calibrations, alignments, etc. that will demonstrate that the hardware complies with the mission requirements

5. Preparation Information:

The System Performance Verification Plan (SPVP) describes the approach (test, analysis, etc.) that will be utilized to verify that the hardware/software complies with mission requirements. If verification relies on tests or analyses at other levels of assembly, describe the relationships. The System Performance Verification Plan will include a section describing the environmental verification program and details the specific environmental parameters used in each test or analysis. Payload peculiarities and interactions with the launch vehicle will be considered when defining quantitative environmental parameters under which the hardware elements must meet their performance requirements.

This Plan includes level of assembly, configuration of item, objectives, facilities, instrumentation, safety considerations, contamination control, test phases and profiles, appropriate functional operations, personnel responsibilities, and requirements for procedures and reports. For each analysis activity, include objectives, a description of the mathematical model, assumptions on which the model will be based, required output, criteria for assessing the acceptability of the results, interaction with related test activity, and requirements for reports.

The Plan provides for an operational methodology for controlling, documenting, and approving activities not part of an approved procedure. It also includes controls that prevent accidents that could damage or contaminate hardware or facilities, or cause personal injury. The controls will include real-time decision-making mechanisms for continuation or suspension of testing after malfunction, and a method for determining retest requirements, including the assessment of the validity of previous tests. Include a test matrix that summarizes all tests to be performed on each component, each subsystem, and the payload. Include tests on EDU performed to satisfy

qualification requirements. Define pass/fail criteria. Include tests and checkouts to be conducted at the spacecraft level and at the launch base.

The SPVP shall incorporate the requirements of the MAR.

A section of the plan will be a "System Performance Verification Matrix" summarizing the flow-down of system specification and Mission Assurance requirements that stipulates how each requirement will be verified, and summarizes compliance/non-compliance with requirements. It will show each specification, MAR, and Calibration/Validation Plan requirement, the reference source (to the specific paragraph or line item), the method of compliance, applicable procedure references, report reference numbers, etc. The System Performance Verification Matrix may be made a separate document.

The Final SPVP due 15 days prior to IPER shall incorporate all review comments.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SE-10	VERIFICATION REPORTS

3. Reference:

MAR 9.2.1.3
SOW 5.3.3

4. Use:

Provide summary of each integration and test result, conformance, non-conformance, and trend data. A Verification Report for all verification types indicated in the System Performance Verification Plan (Test, Analysis, Inspection, Demonstration) shall be generated.

5. Preparation Information:

Integration and test reports are required for all integration and test and environmental test activities commencing at component level testing. Contents of these reports shall include, as a minimum:

A. Summary of the test results of each activity and an assessment of the quality and acceptability of the item tested
B. Summary of the non-conformance occurring during the test and their resolution and corrective actions taken
C. Summary of test results at the spacecraft level.
D. Trends in the performance of critical components
E. Actual sequence of these operations including dates and times
F. For thermal testing, tabulation of test target temperatures and actual test temperatures for all equipment and components
G. For thermal balance testing, a tabulation of test prediction and actual temperatures and a tabulation of other pertinent targeted parameters vs. their actual test values, such as heater powers, heater place temperatures, solar intensity, etc.
H. For follow-on Instruments, compare results to previous instrument(s)

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SE-11	INTERFACE CONTROL DOCUMENT INPUTS

3. Reference:

SOW 4.1.n

4. Use:

To coordinate and control all interface items between the instrument and the spacecraft bus to provide efficient electrical and mechanical integration. To coordinate and control instrument GSE to spacecraft GSE interfaces.

5. Preparation Information:

The Contractor shall support the preparation of Interface Control Documentation (ICD) by the spacecraft contractor by providing detailed information regarding the instrument interface to the spacecraft bus. The data provided by the instrument contractor may be in the form of written documentation, drawings, and schematics; will be in the format specified by the National Polar-orbiting Environmental Satellite System (NPOESS) General Instrument Interface Document (GIID); and will include the information required per the NPOESS GIID. The information required will include instrument electrical GSE and mechanical GSE interfaces.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.: 2. Title:

SE-12 PROPOSED REVISIONS TO THE OLI-TO-NPOESS SPACECRAFTINTERFACE REQUIREMENTS DOCUMENT

3. Reference:

SOW 4.1.m

4. Use:

The document will be used to identify and coordinate OLI interface requirements during the early stages of requirements development. This document will be the predecessor and form the basis of the spacecraft manufacturer developed SC to Instrument ICD.

5. Related Documents:

6. Preparation Information:

The offeror will be provided with a draft IRD based on the Government's notional concept. The offeror shall propose revisions to this draft, working with the NPOESS prime contractor to define the interface requirements between its unique OLI design and the NPOESS platform. The offeror shall include proposed revisions to the IRD in its proposal. The IRD will be finalized by the Government in preparation for the Instrument System Requirements Review.

The offeror shall provide detailed information regarding the proposed interface with the spacecraft bus and requirements placed onto the bus by the instrument. The offeror shall describe the instrument properties such that the spacecraft provider can adequately scope the resources required to accommodate the instrument.

SYSTEMS ASSURANCE DIDS

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SA-1	RELIABILITY REPORT

3. Reference:

SOW 10.3.2
MAR 4.3, 4.4, and 4.4.2

4. Use:

- Sensitivity analyses;
- Evaluations of the effects of design trade-offs or configuration changes;
- Evaluations of the ability of the design to achieve the mission life requirement;
- Inputs into Government Probabilistic Risk Assessment (PRA)

5. Preparation Information:

This Report consists of three parts, the Reliability Prediction (RP), the Failure Modes and Effects Analysis (FMEA), and the Fault Tree Analysis (FTA). These parts may be submitted together or in separate volumes.

The RP shall be prepared in accordance with the MAR (4.4)

A. Initial assessments shall use the parts count reliability prediction methodology of MIL-HDBK-217.
B. As design matures, develop a complete reliability block diagram, failure definitions, and mathematical models in accordance with MIL-HDBK-217.

The FMEA shall be prepared in accordance with the MAR (4.4). The following shall be provided, as a minimum:

A. Failure modes analysis
B. Severity levels of the failure effects as defined in the MAR.
C. Critical Items List (CIL)
D. Summary of Failure modes identified

The FTA shall be prepared in accordance with the MAR (4.4). The following shall be provided as a minimum:

A. The ground rules for the analysis, including definitions of the undesirable end states analyzed,
B. References to documents and data used.

C. The fault tree diagrams.
D. Statement of the results and conclusions.

Changes made after the ICDR to the instrument overall reliability shall be documented in a Class I Change Request.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SA-2	CRITICAL ITEMS LIST (CIL)

3. Reference:

SOW 10.3.1
MAR 4.4.1

4. Use:

Provides information relative to failure modes that present potential catastrophic or critical effects on the mission as well as information on EEE parts applications that fail to meet the derating criteria.

5. Preparation Information:

This shall include, as a minimum:

A. Potential catastrophic failures that can't be eliminated from the system
B. All potential critical/major failures
C. All part applications that don't conform with derating policy
D. Justification for retention of each item listed

All failure modes that are assigned to Severity Categories 1, 1R, 1S and 2, shall be itemized on a CIL and submitted with the Reliability Report. Rationale for retaining the items shall be included on the CIL.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SA-3	WORST CASE ANALYSES

3. References:

SOW 10.3.1
MAR 4.4.4

4. Use:

Provides worst case analyses of critical parameters to determine worst case margins, limits and stresses.

5. Preparation Information:

Data is to be developed by contractor, in accordance with the MAR for parameters related to items such as electronics circuits, optics, electromechanical devices, and mechanical devices, and mechanical elements.

This shall address the worst case analyses performed on each component. These analyses shall encompass the mission life and shall consider all parameters set at minimum and maximum limits and include the effect of environmental stresses on the operation or parameter.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SA-4	FAILURE/ANOMALY REPORTS (FAR)

3. Reference:

SOW 10.1
MAR 2.2.1.1

4. Use:

- Provides reporting, monitoring, and closure of all malfunctions and failures and their corrective actions for the OLI instrument.
- To report failures promptly to the Failure Review Board (FRB) for determination of cause and corrective action.

5. Preparation Information:

These reports shall provide immediate notification (followed by written confirmation) to both the OLI Contract Officer Technical Representative (COTR) and System Assurance Manager of a malfunction or failure.

Reporting of failures will begin with the first power application at the major component, subsystem, or instrument level (as applicable to the hardware level for which the developer is responsible) or the first operation of a mechanical item; it will continue through formal acceptance by the GSFC project office and the post-launch operations, commensurate with developer presence and responsibility at GSFC and launch site operations.

All failures will be documented on GSFC Form 4-2 or an existing developer form, which identifies equivalent information. Developers with access to the GSFC FAR Database will generate Problem Failure reports electronically via that program in lieu of hard copies. Developers may also request, from the GSFC Project Office, complimentary electronic copies of the GSFC FAR system for implementation within their own facility.

Updated information will be submitted to GSFC by hard copy or electronically updated via the developer-accessible FAR Database. FARs submitted to the GSFC for closure will include a copy of all referenced data and will have had all corrective actions accomplished and verified.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SA-5	MATERIAL REVIEW BOARD (MRB) DECISIONS ON NON-CONFORMANCE

3. Reference:

SOW 10.6
MAR 2.2.1

4. Use:

Provides information to GSFC relative to contractor MRB actions taken with regards to nonconforming material.

5. Preparation Information:

Prepare in contractor's format in accordance with the guidelines in the MAR. Provide sufficient detail and supporting material to back up the MRB decisions.

Decisions resulting in recommendations for "repair" or "use as-is" shall require additional documentation.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SA-6	RESPONSES TO ALERTS

3. Reference:

SOW 10.5
MAR 6.4

4. Use:

To inform GSFC of the extent of impact of all reported GIDEP Alerts and Problem Advisories on the contract hardware so that the Project can plan appropriate corrective actions.

5. Preparation Information:

These responses to GSFC on the GIDEP Alerts and Problem Advisories shall be prepared in accordance with the MAR and shall be reported within time intervals requested by GSFC as they impact the project hardware.

Initial responses shall be updated as any Alert report is updated by GIDEP.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SA-7	ACCEPTANCE DATA PACKAGE

3. Reference:

SOW 5.3.3
MAR 2.4

4. Use:

To ensure that the deliverable contract end-items are in accordance with contract requirements prior to NASA acceptance.

5. Preparation Information:

This acceptance data package, as a minimum, shall be comprised of the following:

A. As-built configuration list
B. Hardware parts lists
C. Hardware materials and processes lists
D. Test Log Book (including total operating time and cycle records)
E. Open item lists (including reasons for being open)
F. Safety compliance data package
G. Limited life items listings and status
H. Environmental tests results
I. Subsystem tests results
J. Calibration tests results
K. Critical parameters trend data
L. Final comprehensive performance test results

A copy of this package shall accompany each end item, in addition to the delivery requirements in Table 3-1.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SA-8	LIMITED LIFE ITEMS LIST

3. Reference:

SOW 10.6
MAR 4.6

4. Use:

Provides data on limited life items or items subject to degradation with age used on OLI for GSFC to review and approve acceptability for implementation and for flight.

5. Preparation Information:

Prepare the list and related information for each mission in accordance with the MAR, Para. 8.4.

The list shall include the expected life and the rationale for the selection of each item.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SA-9	MATERIALS IDENTIFICATION LIST (MIL)

3. Reference:

SOW 10.6
MAR 7.2.1

4. Use:

Listing of all materials for use in spaceflight hardware.

5. Preparation Information:

The MIL will be prepared and maintained throughout the life of the project. The MIL will be compiled by instrument, instrument component, or spacecraft component, and will include the following information, as a minimum:

A. Material Name
B. Manufacturer
C. Manufacturer's Material Spec. Number
D. MIL. , ASTM., FED. or Other Spec. Number
E. Procurement Specification
F. Description Of Material
G. Expected Environment
H. Reason for Selection

Any format may be used provided the required information is included. All submissions to GSFC will include a paper copy and a computer readable form.

Updates to MIL will identify changes from the previous submission.
Updates to MIL will be available at the developer's facility for review.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SA-10	SAFETY WAIVER/NON-COMPLIANCE REQUESTS

3. Reference:

SOW 10.2
MAR 4.4.1

4. Use:

Initiate formal request for Range resolution of safety risks that have not been or cannot be eliminated. The three types of non-conformance requests include:

- Meets Intent Certification (MICs)
- Deviation
- Waivers

5. Preparation Information:

These shall be prepared in accordance with the MAR, using AFSPC MAN 91-710 "Range Safety User Requirements Manual". The minimum that shall be included in the request is:
and shall include, as a minimum:

A. Type of request
B. Descriptive title
C. Category
D. Effectivity
E. Background
   (a) Summary of Range Safety Requirement
   (b) Statement of non-compliance
   (c) Reason for request
F. Condition for MIC, deviation, or waiver
   (a) Hazard mitigation
   (b) Get well plan

Each waiver request shall address only one non-conformance.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SA-11	PHOTOGRAPHIC & VIDEO RECORDS

3. Reference:

SOW 10.9

4. Use:

Program status reviews; system, subsystem, and component packaging evaluations; and trouble shooting.

5. Preparation Information:

A. Still Photography (Digital Preferred)

(a) Pictures shall be made at appropriate points in the development of flight model OLIs.

(b) Pictures shall be made of the major subsystems, critical components, the full-up system, and major GSE items.

(c) The pictures shall serve as a record of the build-up of a major flight component or subsystem; e.g., a typical electronic card, mother board, electronic subsystem with cover off, etc.

(d) Pictures of environmental test fixtures shall also be provided.

B. Video (Digital Preferred)

(a) Video tape Instrument moves

(b) Video tape Mechanism movements

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SA-12	PARTS IDENTIFICATION LIST (PIL)

3. Reference:

SOW 10.4
MAR 6.3.2

4. Use:

Listing of all EEE parts intended for use in spaceflight hardware.

5. Preparation Information:

The PIL will be prepared and maintained throughout the life of the project. The PIL will be compiled by instrument, instrument component, or spacecraft component, and will include the following information, as a minimum:

A. Part name
B. Part number
C. Manufacturer
D. Manufacturer's generic part number
E. Procurement specification

Any format may be used provided the required information is included. All submissions to GSFC will include a paper copy and a computer readable form.

Updates to PIL will identify changes from the previous submission.

Updates to PIL will be available at the developer's facility for review.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SA-13	CONTAMINATION CONTROL PLAN

3. Reference:
SOW 4.1.g
SOW 10.8
MAR 12.2

4. Use:

Provide an integrated contamination control plan:

- To define level of cleanliness and methods/procedures to be followed to achieve adequate cleanliness/contamination control
- To define the approach required to maintain cleanliness/contamination control through shipping, spacecraft integration test, and flight

5. Preparation Information:

A. Pre-flight:

(a) Define the methods, procedures, and schedule requirements for integrating spacecraft instruments contamination control requirements in this control plan.

(b) Define methods for determining a budget for allowable accretions for each phase of the program.

(c) Define levels of cleanliness and methods/procedures to be followed for this Project, from start of contract to end of mission, referencing all analyses to get performed to assess instrument sensitivity and to define requirements. Show that these methods/procedures are in consonance with the OLI-to-NPOESS spacecraft ICD requirements.

(d) Identify critical fabrication and assembly activities, which will be performed in clean rooms or in clean room benches at ISO class 7 (or lower) level as defined in ISO 14644-1. Provide an integrated operations flow chart.

(e) Identify the controls over atmospheric contaminants, temperature, and humidity which will be used during electronic fabrication (including soldering), integration, testing, transportation, and launch. Indicate how these controls will meet the requirements, including a description of all facilities that will be used.

(f) Identify design features of shipping containers, which will keep contamination of flight hardware during shipping and storage within the contamination budget.

(g) Define the requirements and methods/procedures required to maintain cleanliness during spacecraft and laboratory fabrication, integration, and test.

(h) Show that the efforts to control contamination are consistent with controls to prevent electrostatic damage.

(i) Indicate the methods and frequency for monitoring cleanliness levels and accretions to ensure compliance with requirements.

(j) Define criteria for materials selection and acceptance relative to contamination control.

(k) Specify criteria for bake-out of critical subsystems.

(l) Provide a contamination training program. All personnel required to work in clean areas with flight hardware must be trained to work according to clean area procedures.

(m) Define overall vent location and orientation policy, indicating how unintentional venting shall be avoided. (All applicable drawings should show vent locations that comply with venting analysis.)

(n) Identify cleaning, inspection, and bagging to be used for parts, flight subassemblies, and the assembled instrument. Identify how other activities will meet the requirements, and reference the procedures used for these activities.

(o) Identify and characterize all sources of contamination, particulate and molecular, that can be emitted from the instrument.

B. Flight

Define the design requirements and design approach for contamination control for launch operation through mission.

This shall be prepared in accordance with the MAR.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SA-14	Missile System Pre-Launch Safety Package (MSPSP) INPUTS

3. Reference:

SOW 10.2

4. Use:

Documents the hazard identification and elimination/control requirements. (Previously termed Safety Assessment Report, SAR)

5. Preparation Information:

The developer shall submit to NASA a MSPSP relative to the instrument which complies with the requirements of AFSPC MAN 91-prior to each of the WR safety review. The MSPSP shall be updated as necessary. The content of the package shall identify all safety features of the hardware, software, and system design, as well as procedural related hazards present in the system. It shall include:

A. Safety criteria and methodology used to classify and rank hazards
B. Results of hazard analyses and tests used to identify hazards in the system
C. Hazard reports documenting the results of the safety program efforts
D. List of hazardous materials generated or used in the system
E. Conclusion with a signed statement that all identified hazards have been eliminated or controlled to an acceptable level
F. Recommendations applicable to hazards at the interface of their system
G. List of safety non-compliances and associated rationale for acceptance
H. The developer shall submit hazard reports as required.

This report will be used by the LDCM Project to generate the MSPSP for submittal to the launch range.

OSSMA will review each submittal prior to submittal of the MSPSP to Range Safety.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SA-15	ORBITAL DEBRIS ASSESSMENT INPUTS

3. Reference:

SOW 4.1.q
MAR 3.6

4. Use:

Ensure NASA requirements for post mission orbital debris control are met.

5. Preparation Information:

The Orbital Debris Assessment shall supply design data sufficient to support the performance of an Orbital Debris Assessment of the Satellite.

The Orbital Debris Assessment shall include mass, dimensions, and material for all individual assemblies and structural elements.

Where assemblies are constructed of more than one material (e.g. titanium motor inside aluminum housing), the Orbital Debris Assessment shall include the mass, dimensions and materials for these items.

(Refer to NPD 871)

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
SA-16	MECHANISM LIFE TEST PLAN

3. Reference:

SOW 10.6
MAR 7.1

4. Use:

For evaluation and approval of mechanisms.

5. Preparation Information:

All mechanisms shall be qualified by life testing; or heritage of an identical mechanism used in identical applications. The Mechanisms Life Test Plan shall contain the following, as a minimum:

A. Table of Contents
B. Description of all lubricated mechanisms, performance functions, summary of subsystem specifications and life requirements.
C. Heritage of identical mechanisms and descriptions of identical applications.
D. Design, drawings and lubrication system utilized by the mechanism.
E. Test plan including vacuum, temperature and vibration test environmental conditions of the test
F. Criteria for a successful test.
G. Delivery of test hardware to Government after a successful test

ON ORBIT DIDS

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
OO-1	OLI ON ORBIT INITIALIZATION AND VALIDATION PLAN

3. Reference:

SOW 7.2.a

4. Use:

Contains the information required to understand OLI operations and constraints during the pre-operational period.

5. Preparation Information:

Prior to each OLI flight opportunity, the contractor shall provide a plan for operating the OLI during the pre-operational period. The plan shall include a pre-operational concept of testing and timelines which call out procedures to be used, tests to be performed, constraints to operations, and any other information required to schedule OLI operations with the spacecraft.

The roles and responsibilities for conducting operations and contact information for operators, engineers and system support for configuration, maintenance and operation of the interface between Contractor and Government systems shall be provided.

The plan shall provide contractor plans for handling communications and decision-making in the event of non-nominal results during testing. These plans shall include, contact information for critical personnel, and identify contingency procedures available.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
OO-2	OLI OPERATIONAL PROCEDURES

3. Reference:

SOW 7.2.e

4. Use:

Contains the complete set of procedures required for operating the OLI following Launch vehicle mate and while on orbit. Each phase shall have procedures for testing, calibration, routine, and contingency operations.

5. Preparation Information:

The Operations Procedures shall provide a detailed set of operations procedures for the OLI Instrument. These shall include testing, calibration, routine, and contingency procedures for the following phases:

A. Pre-launch (while mated to the Launch Vehicle)
B. Launch and Early Orbit
C. Initialization and Checkout
D. Operations
E. End of life

These procedures should define expected results in telemetry and associated caution and warning levels.

These procedures shall describe the equipment, methods, accuracies, and command sequences for in-flight calibration. Fail-safe methods shall be used for conducting in-flight calibration.

These procedures shall describe the modes of operation, the transitions from one to another, and the command sequences necessary to configure the instrument in any phase of any operational mode described in the specifications.

This document shall be maintained during the operations phase of the LDCM contract and shall be modified as necessary during training, operations exercises and procedure reviews.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.: OO-3

2. Title: OLI USERS MANUAL

3. Reference:

SOW 4.1.r

4. Use:

The report shall be a self-contained document in that a reader not familiar with the instrument can obtain a reasonably complete understanding of the instrument without recourse to another document or drawing. The document is not meant to be an engineering working document but a reference document for OLI data users including: Government personnel, scientists, spacecraft contractor personnel, and the general public.

5. Preparation Information:

An OLI User's Manual shall be prepared for each instrument. The OLI User's manual shall provide non-proprietary description of the system, subsystems, functions and operations, with illustrations, block diagrams and circuitry descriptions. The instrument to spacecraft interface shall be described. The report shall be a self-contained document in that a reader not familiar with the instrument can obtain a reasonably complete understanding of the instrument and its operation without recourse to another document or drawing. The document is not meant to be an engineering working document but a reference document for Government personnel, scientists, spacecraft contractor personnel, and the general public of OLI data users.

Each OLI User's Manual shall characterize instrument performance with respect to: relative spectral response; radiometric accuracy, sensitivity, and stability; and line-of-sight accuracy, Each Manual shall provide pre-flight test results characterizing performance and a flight performance evaluation with updates at major milestones. The document shall describe the OLI modes of operation and the equipment, methods, accuracies, and concepts of operation for in-flight calibration of radiometric response and line-of-sight.

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
OO-4	OPERATION AND MAINTENANCE MANUALS

3. Reference:

SOW 4.1.s

4. Use:

For operating and servicing OLI and GSE.

5. Preparation Information:

Operation and maintenance manuals shall be prepared for the OLI and for all GSE. As a minimum these manuals shall contain the system and subsystem description, function and operation, block diagrams and circuitry description, operation and test procedures, maintenance, and performance data. These manuals, in conjunction with the detailed drawings, shall provide all the information needed for operating and servicing the OLI and GSE. These manuals shall be updated during the program to reflect any changes, including differences between the Engineering Development Unit and the Flight Model(s). These manuals shall be provided for the Engineering Development Unit (as appropriate for level of EDU assembly), the instrument simulators, and each Flight Model.

DESCRIPTION OF REQUIRED DATA

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1. CDRL No.: 2. Title:

OO-5 ON ORBIT PERFORMANCE REPORT

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3. Reference:

SOW 7.2.i

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4. Use:
For documenting the results of the testing program and the performance of the OLI instrument following on orbit calibration.

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5. Preparation Information:

For each spacecraft, a Post IOC Performance Report shall contain the following at a minimum:

A. Launch and early orbit operations results
B. On-orbit checkout results
C. Calibration/Validation results, including spacecraft-level environmental test results, and comparison to pre-launch baselines
D. As run procedures
E. Algorithms and calibration coefficients used throughout the test period
F. Anomalous behavior and resolution
G. Current Status of the OLI, including redundancy
H. Lessons learned

DESCRIPTION OF REQUIRED DATA

1. CDRL No.:	2. Title:
OO-6	TRAINING MANUALS

3. Reference:

SOW 5.1.2
SOW 5.1.3
SOW 7.1

4. Use:
To provide information and training on the operation and handling of the OLI simulator, the OLI Engineering Development Unit (EDU), and the OLI Flight Model (FM) to personnel who will be required to operate and handle these units.

5. Preparation Information:

Separate Training Manuals are to be prepared for training sessions for the OLI simulator, the EDU and the FM. Manuals will include a hard copy of all presentation materials used in the training sessions, as well as any detailed information appropriate for inclusion.

Manuals shall include basic operation and handling information. The level of detail shall be appropriate for a training aid, not for actual operation of the item.